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Sci-fi rapping

Communicating with aliens is not always as easy as "Mr Elliott, you E.T." David Langford challenges you not to alienate the aliens as they swarm into the atmosphere above you uncertain whether to make friends or attack.

We take you through the sci-fi precedents and offer a listing on page 24.

Be friend an alien today. Star Wars only had one empire, we've got seven and inter-space conflict is breaking out on page 86. This unique competition/game will be running for many months to come, with a new winner every issue. It may be too late for you to take part in February but there's nothing to stop you joining in Seventh Empire for March.

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NEXT

Hot-on-the-heels of the Book of Games comes our Book of Reviews in the March issue

Our next issue boasts a free give-away guide to all kinds of computer games, who supplies them and how they compare.

We have sections on adventure games, chess, draughts, othello and backgammon games, arcade maze games, space attack games, novelty games and many more.

There's expert advice on how to choose the particular type of game you are interested in, what you should be looking for and what standards to expect.

WHAT'S BUGGIN' YOU?



Not getting a regular copy of *Computer & Video Games* oh! How do you expect your micro to work proper if you aren't reading the magazine every issue? And you with a nice little computer like that too.

Of course, I can't promise that if you had a regular copy of *C&VG* on order, your rampack would mysteriously stop wobbling overnight... but who can tell eh...

Just fill in the coupon (below) or I'll let you see your sister again.

Know what I mean?

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For those of you unfamiliar with particular games, we have devoted a page to explaining the differences between Donkey Kong and Frogger, how to recognise a Galaxian when you see one and how to tell whether a Pacman ghost is edible or not.

Each cassette or disc reviewed is marked in our usual three categories, Getting Started, Value and Playability and if it scores three 10s you know our judges have been suitably impressed.

It all adds up to the most stinking work yet on games software and it's free inside every copy of *Computer & Video Games*.

All you Seventh Empire competitors will need our March issue to check on your new position in the Seventh Empire game.

You might have proved to be the best fleet commander in the galaxy and earned yourself a Colour Genie on the way.

But even if you work out your score to be well behind the leaders, keep your fleets on the move in March there's still plenty of time to catch up.

Among our top games for March will be a version of Donkey Kong — featuring Mario the carpenter and an escaped gorilla; Digger will ask you to dig a hole and trap a rampaging alien; there's Skunk, Rockfall and Dr Who Adventure.



Confessions of a Bug

So you think it's easy being a Bug huh? Well you should try sneaking a dodgy listing past the *Computer & Video Games* testers.

The month of January tho', we didn't do too bad. Mal Function managed to pull a whole host of lines out of the ZX81 game Curse of the Aztec Tomb (shown below).

On Cave Flight most of you managed to spot the two arrow errors. In line 2040 the arrow should point left. In line 2515 the arrow should point right.

Dragon problems are fixed by:
250 IF INKEY\$="" THEN 250
150 CLSO: CLEAR 200: FOR I=0 TO 448 STEP 32: PRINT @ I, CHR\$(245): PRINT @ I+31, CHR\$(250): NEXT I: PRINT @ 0, STRINGS(32,255);
330 FOR I=55 TO 161 STEP 32: PRINT @ I, STRINGS(30, (143+(I-1)/2)); NEXT I: RETURN



6. COMPUTER & VIDEO GAMES



Please drop up a line to: Computer and Video Games, EMAP Durrant House, 8 Herbal Hill, London EC1R 5JB

SPECTRUM OUTBURST

Dear Sir,
I really must reply to Mr McAuley's extraordinary outburst on the Sinclair Spectrum.

The fault record of previous Sinclair machines was truly deplorable. A number of my friends and colleagues have had them. All have had problems and one tells me that the ZX81 he bought in April this year has been back to Sinclair four times so far. It has been in his hands for only seven weeks so far.

The Spectrum may be better so few have been cleared so far that we cannot judge.

Sinclair machines are presumably meant for entertainment only. The Basic used is both limiting and limited with a consequent effect on possible programs.

Judging by the reaction of my nine-year-old son, who has used a friend's Spectrum, it is outgrown within three months. £213 for a three month toy is expensive by my standards.

Most adults are prevailed upon to buy a micro with two distinct arguments, (a) to assist in the education of their children.

(b) to use themselves for serious work.

What serious work could be done on a Spectrum? A payroll — for maybe twenty employees? Stock control for perhaps fifty item lines and five movements each per week? Word processing is out, without CP/M compatibility.

As for his penultimate paragraph, is he really telling us that Sinclair computers compete with the likes of IBM, Canon, Burroughs etc? Indeed, Sinclair manufactured calculators in the past, and micros now but I was not aware that Sinclair make or have ever made computers?

"TTV is the best in the world!" I have live in Germany, France, Italy, Canada, Australia and the USA. With the exception of much native USA product, all these countries produce first class TV programmes.

If I had only £300 to spend I don't think I'd buy either any Sinclair product or the Beeb.

I think I'd go for the Cetus II — a much undenated machine. As it is, I spent rather more on a 64K machine nearly a year ago, with not the faintest sniff of a breakdown so far. Good for games, and with CP/M, equally so for business.

Lastly, "Methinks, thou dost protest too much" Mr McAuley!
R. H. Hill,
Woodford Green,
Essex

BBC IS THE BEST, OK?

Dear Sir,
I have just read Alan McAuley's letter in your December issue with disbelief. Has he actually used a BBC Micro? I doubt it very much.

For all those Spectrum owners, who, mistakenly, think the Spectrum is "better" than the BBC Micro: just look at the facts.

Spectrum good points.
Syntax check on entry, cheap price.

Spectrum bad points: Slow BASIC (3-5 times slower than the BBC Micro).

Poor quality sound (the BBC Micro has four sound channels with full AD/RS control). High resolution graphics poor. Keyboards extremely difficult to type fast on (BBC Micro has a very good keyboard). Keyboard system a waste of time: up to six key presses needed for some functions! (Anyway, most BBC Basic commands can be abbreviated).

Note that I haven't

mentioned the BBC Micro's built-in assembler, the flexible Mode system for choosing screen format, the superb extended Microsoft Basic or the brilliant software available: just look closely at the Acornsoft range.

I hope this letter has finally shown to all those Spectrum owners that the BBC Micro is the best home computer in the world.

Richard K. Lloyd,
Wirral,
Merseyside

ICE VENDOR VINDICATED!

Dear Sir,
With reference to Computer and Video Games issue number 13 — November 1982 I am writing to complain about the Pet/Apple program, Ice Cream Vendor Line 10 reads:

VTAB 10: PRINT TAB (10)

I was putting the program in our Pet computer at school when after the 19 we listed the program and a syntax



error appeared in line 10.

We tried deleting the "v" in it and that didn't work then we tried a space between the "v" and the "tab" but that still didn't work.

After about 10 minutes of puzzling it out we decided on deleting the "v" and the "tab" and Bingo! it worked!

Andrew Gardner,
Shanklin,
Isle of Wight.

ALIEN CHASE AMENDMENTS

Dear Sir,
Many thanks for the excellent standard of games in your magazine. I haven't typed in a bad one yet!

However, the December issue BBC game Alien Chase could give those of us with issue 1 (etc) operating systems some trouble.

In order to retain the features of the game, 2 changes need to be made.
80 VDU 23;10,32,0,0,0;
110 IF INKEY(-99) THEN
1% = 226 ELSE IF
INKEY(+122) THEN 1% = 249
ELSE IF INKEY(-26) THEN
1% = 153

This does the trick and the game proceeds as designed. I have also written an amendment for joystick:
110 IF (ADVVAL(0)AND3) = 1
1% = 226 ELSE IF
ADVVAL(1) < 21000 1% = 249
ELSE IF ADVVAL (1) > 44000
1% = 153

Dave Carlos,
Garforth,
Leeds

TANDY AND THE DRAGON

Dear Sir,
Please could you tell me if the Tandy TRS-90 machines uses the same machine code as the Dragon 32 and if you can use Tandy games on it? If there are any other computers that use the same machine code could you tell me about them.
John De Silva,
Guildford.

Surrey
Editor's reply: The Dragon is based on the Tandy Colour Computer — not the TRS-90. It is therefore impossible to take the latter's machine code, which is for the Z80 microprocessor, and use it on the Colour Computer/Dragon 32, which has the 6805 processor.



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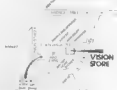
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SEARCH FOR SOFTWARE

Dear Sir,
Having bought a Dragon 32 micro-computer I have found that up to now there has been a lack of available software for it.

I have heard, however, that because it uses microcrist basic it is possible to use software from the Tandy Colour Computer and the BBC computer. Is this correct?

And will you be featuring the programs for the Dragon in the near future? Keep up the excellent (art) work!
*Simon Malpas,
Keyworth,
Nottinghamshire.*

Editor's reply: It is possible to enter listings for programs designed for the Tandy Colour Computer with very little modification.

Although all the more popular computers claim to use Microsoft Basic, there are so many different versions that it is very difficult to translate Pet to Apple to TRS-80 to Colour Computer/Dragon 32.

The BBC does not use Microsoft Basic it uses a peculiar and unique Basic that is supposed to be compatible with Microsoft. This is rather a tenuous claim for some of the commands!!

THE DREADED DISC QUIZ

Dear Sir,
As a video games enthusiast and the proud owner of an Intellivision games console, I was delighted to find your magazine at my local newsagent and have taken it regularly ever since.

Although I do not own a micro at present and so cannot run the programs listed each month, I do get immense enjoyment from reading all the other features, i.e. Mailbag, Games News, Arcade Action and so on.

However, having said that, I have heard that Mattel do plan to launch an add-on keyboard about March of

this year so there are some programming possibilities.

My main reason for writing to you is to try to find out what other people think of the Mattel system and in particular the "dreaded disc", their alternative to either joysticks or paddles as favoured by Atari, etc.

Although I find the disc reasonably easy to manage myself, most of my friends seem to disagree. Perhaps if this version could be got through to Mattel they may seriously consider bringing out some alternative form of control.

Finally, here is a list of my current high scores: Space Armada 500,320; Astrosmash 1,125,760; Lock'n'Chase 135,980; Space Hawk 253,890

I would be most interested to learn if anyone can beat these or of any other high scores on Mattel games.
*Marc Duffield,
Huddersfield,
Yorks*



THE BUGS ARE OUT!

Dear Sir,
One night after I had fallen asleep over my Sinclair Spectrum I was suddenly woken by cries of "Stamp on him", "Shove a club in his mouth!" Quick as a flash, I jumped up grabbed my camera and managed to get a photo of this amazing attack before they all disappeared inside my copy of *Computer and Video Games*!

Please print the photograph otherwise no-one will ever believe me
*J. Carroll,
Rushon,
Lancashire.*

BACK TO THE MANUAL...

Dear Sir,
Please would you explain how to introduce variables into a defined function from the main body of a program for BBC Basic.
*Neeraj Sharma,
Slough,
Berkshire.*

Editor's reply: This is quite complex Basic programming I suggest you look at page 230 in the BBC manual.

GETTING THE CONNECTION

Dear Sir,
We have a BBC Model B at our school. We also have two printers, an Epson dot matrix printer MX80 F/T and an MX80 F/T type II which we use with our Research Machines 3B02.

I have some problems for

through the parallel printer port. It all depends on your printers which standard you use.

Both of the following companies produce good Invader-type programs.
*Bridge Software, 36
Fernwood, Marple Bridge,
Stockport. Ambs Software,
13 Cherry Bonnds Road,
Gorton, Cambridge CB3 0JT.*

JOIN UP FOR ADVENTURE

Dear Sir,
A postal BBC Micro Adventure/Fantasy Club has now been formed. The club will provide a central library of Adventure and Fantasy games written by the members for the use of other members.

In this way Adventurers can find a ready group of fellow enthusiasts to share their fantastic journeys. Send an a.s.c. for further details.
*BBC Micro Adventure Club,
29 Blackthorne Drive,
Larkfield,
Kent ME20 6NR.*

MYSTERIES OF THE SCROLL

Dear Sir,
Recently I have been trying to get my Vic to print random dots on the screen at random, then scroll the screen from right to left, while still printing dots at random. My attempts have been fruitless.

Please could you tell me the solution before I go mad with frustration!

*J. Skelding,
Sourbridge,
West Midlands*

Editor's reply: It is easy, using the Poke instruction to get random dots on the screen. For example, using the information on pages 143/144 of the Vic instruction manual.

$10 \times = \text{INT}(\text{RND}(1) \times 506 + 1)$
20 POKE 7660 + \times , 42
30 GOTO 10

This will produce a random pattern of stars. I suggest you read the appropriate section of the *Vic Revealed*, by Nick Hampshire for ideas on how to scroll from left to right — it's far too complicated to explain in this small space.

the BBC which I require hard copies of, and as we do not yet have a BBC printer I was wondering whether either of the printers are compatible.

Could you also advise me on the best Space Invader type games for the BBC?
*Martin Noakes,
Sunningbourne,
Kent.*

Editor's reply: If you have a Model B computer then the Epson printers — with RS232C interfaces — should work OK; however, the socket at the rear of the BBC computer — 5-way PIN — is non-standard for RS232C. So a special cable is required. (See page 406 of manual). Centronics parallel standard is available

Solving our earth invading puzzle

Saving the Earth from the alien hordes was the problem we set you last month and the more spirited defenders amongst you replied swiftly enough to keep our atmosphere free for oons to come.

The best solution Trevor Truran could manage was 21 shots to clear the atmosphere, or just two missed shots.

His best effort began at F and went on: A, E, B, E, C, C, D, B, F, B, C, C, F, C, A, D, A, C, D, F.

We will be publishing the winning names next month.

And Trevor's back with another Puzzling column in March.



A GOOD HOME FOR A DRAGON

The Sorcerer's Stone has captured a Dragon for its creator.

Andy Burras of Landle Lane, Hutton, Preston in Lancashire, is the worthy winner of the Fantasy Game Competition we set in our November issue.

He wins a Dragon 32 micro-computer on which to pursue his thirst for fantasy games. And he is also being invited down by Mitre Wargames, which judged the competition entries, to discuss putting Sorcerer's Stone into operation as a new computer moderated game format to be played commercially.

Mark Blundell, of Mitre Wargames was impressed by the high standard of entries and offers his congratulations to the unlucky entrants, but felt that Sorcerer's Stone came closest to a workable computer moderated game format. "The author had put a lot of thought into how the game could be put onto a computer," said Mark.

Sorcerer's Stone is a game for

PIRATE WITH A HEART OF GOLD

I'm the brighter buccaneer, the Simon Templar of the Space lanes, the man in the white space helmet. I may be a Pirate King but I am a **Good Guy** I seek out and eliminate the outposts of my arch enemies, the oppressive Berserkers.

One of these, Czutu, has been a thorn in my flesh with his absurd threats and impudence.

Another, a former ally of mine, threatened me recently so I sent the fleets in.

I liberate the oppressed prey of Berserkers, set free those under the yoke of Empire Builders like Merchants and Artifact collectors.

And what do I take in return? I do not seek to kill populations or make people work hard on my fleets, all I ask for the liberation of the oppressed is a little piece of the booty, a few spondulix, some wherewithal, little to ask for my services to life-kind.

It must be shown that aggression does not pay, aggressors must be punished, and I am the man capable of such a feat.

I am amassing a Task Force.

A collection of fleets, this force will be so fast that when in Battle formation it will almost blot out the most powerful of Suns.

A force so huge and powerful that Berserker robots will quail at its presence, and Apostles will pray at its coming.

This task force will be headed by myself in the flagship, A.C. Freedom-for-All ready to wage terrible war on evil-doers.

We will fight them on the Space-lanes, at the planets and near the Black Holes, there will be blood, oil, and tears, but we will never surrender...

There is No Alternative but to stand up and fight. The time for Diplomacy is over, the time for action is here. Fight, we will, for the elimination of Berserkers and life-kind's inexorable right to be free!

I am so cool I could sluster a Penguin, and I am so hip I have difficulty seeing over my pelvis.

Never let it be said that Austin Cambridge did not play the major role in the freedom of the Galaxy.

12-15 players, who each takes control of a wizard in a tower. The aim is to capture the Sorcerer's Stones by making use of the wizard's orcs, elfen and dwarfish servants and casting spells by using up power points.

The game has been well planned out for use on a computer and Mark is confident that he will be able to report on a new fully-fledged British computer-moderated game in the autumn.

A Dragon 32 will be winging its way, courtesy of Dragon Data, to Andy in Preston.

● Apologies if you are still waiting for news of our pinball competition, which was run over August and September. Bally's US Pinball Division have had a tough job sorting through the huge pile of entries we sent Stateside but Bally are announcing the winner next month to coincide with the UK Amusement Trades Exhibition. So keep your fingers crossed.



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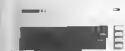
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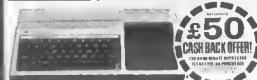
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NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS GAMES NEWS

MYSTERY OF THE DARKLY GLOWING GEM

BLACK CRYSTAL

In order to win the Black Crystal you must first seek out the seven gold rings and place them on their pedestals — ranged in a circle around the brilliant gem.

But even before you get to see the crystal you will have to overcome dozens of dangerous challenges. The sheer number of episodes in this game make it one of the longest adventures ever written — with 12 different screen presentations.

As you pursue your adventure you have three main strengths to supplement your natural cunning. Physical strength consists of your two principal weapons, a sword and a shield.

Plenty enables you to be brought back to life if you meet with a goblin and at the claws of one of the dragons or vampires which haunt this adventure.

The spiritual strength at your disposal are lightning and "power drain".

Black Crystal is available from Camell Software of Slough at £7.50. The game runs on a Sinclair Spectrum in 16 and 48K and on a ZX81 in 16K.

BEWARE OF UNDERWATER ENEMIES

SUB TRACK

Sub Track is a new Spectrum version of an arcade game.

You command a destroyer being pursued by a fleet of enemy submarines. Your only defence is your depth charges which you must drop at just the right moment so that they will knock out the submarines a few seconds later as they pass below you.

Sub Track is manufactured by the new Spectrum writers — Amba Software of Cambridge. Also in the range is an Adventure game called Treasure Hunt and a version of Pacman. The games cost £4.95.



WHEN IS A CASTLE A RIDDLE?

CASTLE OF RIDDLES

More prizes are on offer this month as the software houses compete to sell their goods.

Acorn goods worth £2,000 are up for grabs to the first person to solve the Castle of Riddles adventure for the BBC Model B.

This classic text only adventure has an added twist of humour with such gems as "What gets wet as you get dry?" Answer: a towel.

The release date of Castle of Riddles has been strictly timed so that any one who purchases

the game, whether by mail order or over the counter, will have an equal chance of getting hold of the game at the same time and entering the competition.

Other exciting prizes planned for 1983 include a number of holidays to far-away places. Most interesting of these is Animate Cartography's trip to the U.S. to meet a mystery celebrity whose identity is hidden away in the bits and bytes of the new Spectrum game "My Name is Adolf Hitler, You Win a Fat Cigar". Who can the celebrity be? Who will win the prize? Will this reporter be going to the U.S. to cover this momentous meeting? All will be revealed in Games News soon.

Another holiday — destination undecided — it to be put up by Camell Software of Slough for their next adventure game which will be the sequel to the epic Black Crystal adventure.

A JOLLY MIXTURE OF FUN ... COMPENDIUM

That Rolls Royce of board games, the De-Luxe Compendium is now a thing of the past as all the family favourites such as Snakes and Ladders, Ludo, Fox and Geese, Beetle, and even Noughts and Crosses can all be stored on one computer cassette.

The computer compendium

has a number of advantages over the traditional board version. It is impossible to lose the counters and the dice or other essentials to play as these are safely stored away on the cassette tape.

Furthermore, in a game like Noughts and Crosses for example, you can play against the computer if you are short of another human opponent.

A games compendium for the Sinclair Spectrum in 16K has been produced by Dymond Software of Annan. It features the above five games and is available from the Dumfrieshire based firm at £4.95.

LAST REFUGE OF THE GALAXIANS

ARCADE CLASSICS

Arcade classics Galaxians and Delander are enjoying a new lease of life as game manufacturers regularly churn out versions for the popular micros.

Delander is one of the few video games to come out of the boom period of 1980-81 to be still consistently earning ten pence prizes in the local pubs and arcades.

Its paintwork is probably now a little shabby but you can be sure that wherever a Delander machine is found there is also a small group of devotees regularly ransacking the humanoids.

The bluebottle like Galaxians have not been quite so fortunate. Pushed aside by Robotron, Sniggerites, Pacmans, and more recently Pengo — it now seems that British R&D outfits and bars are the only sure places to find a Galaxians machine these days.

Whatever the future holds for these quaint old relics of the pay-as-you-play games era you can still enjoy them as versions are now on sale for the BBC Model B, and Atari 400 and 800.

Cambridge based Acornsoft produce the games for the BBC machine — though sold under different names Planetoid for Delander and Accidians for Galaxians.

The Atari versions are available under the original names although the retail prices are not available as we go to press.



NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NEW GAMES NEWS

GO TO WORK SMASHING AN EGG!

EXTERMINATOR

If you shook with last week watching Hitchcock's *The Birds* then you will be scared to learn that they are back. This time gunning not only for planet Earth but the entire universe!

You are charged with the mission of seeking out the birds' secret lair on the planet Dron. This is where they lay their eggs and hatch their plot of intergalactic supremacy. The only way to stop the birds is to destroy their eggs.

Exterminator is the name of the game for the TRS-80 or Video Game. It can be purchased from Algray software at £7.95.

Also new from Algray this month is a 3D adventure game called Double Agent. You are the spy who must break in to a high security fortress and escape with top secret plans. The game comes with a money-back guarantee from the Bernsley based company of £12.95.

SURVIVAL OF THE FITTEST AMOEBA!

EVOLUTION

Experience millions of years of evolution in a few minutes in this latest game for the Apple.

Only the strong survive in Evolution — sentiments which Charles Darwin would no doubt echo.

You begin the evolutionary cycle as an amoeba swimming in a fluid of DNA cells which you must try to consume to nourish your weak one-celled life form. Spores, microbes, and antibodies are also struggling for supremacy and will feed



on you if they can touch you. If you survive the amoeba stage you then jump a few million years to become a frog. This time flesh is your food source and fish your competitors.

From frog you go on to rodent, then beaver, then gorilla and finally human. The game does not end there. A final battle must be fought with the mutants followed by a nuclear war which could just spell doom for the human race.

Evolution was written by two Canadian teenagers who brought it into the offices of a Vancouver based business software house.

The firm liked it so much they decided to market it. And now the youngsters are predicted to be thousands of dollars better off by the end of 1983 according to the managing director of the company.

The game is produced by the Sydney Development Corporation — a Canadian business software firm. It is available in this country from Peta and Pam Computers at around £40.

DOWN TO THE SEA AND SKY AGAIN

SUB COMMANDER

Submarine Commander and Jumbo Jet Pilot, the two TV advertised games from Thorn EMI for the Alan 400 and 800 will shortly be available for the Texas Instruments 99/4e.

The simulation games give you a taste of flying a Jumbo and commanding a submarine in war time. Both games feature a variety of realistic controls. Submarine Commander for example challenges you to destroy all enemy shipping operating in the Mediterranean.

You have sensor to help you find them when submerged, radar, oxygen level, fuel, battery charge, depth under your keel, periscope and screen presentation of the surface and sky line, a map of the Mediterranean, and radar scanner.

The games will be on sale towards the end of January at around £30.

WIN YOUR COWBOY SPURS...

CHISHOLM TRAIL

TI owners can look forward to a wider choice of games in the new year as some of the smaller software houses — currently manufacturing for the Vic, Spectrum, and BBC machines — are negotiating with Texas to produce games for the 99/4e.

The latest game

from Texas takes you back to the cattle trails of old Kansas with rustlers, wild steers and wranglers. For non High Chaparral fans a wrangler is a semi-legat rustler employed by a rival cattle herder to pick up the strays from your herd and then brand them with his own mark.

Chisholm Trail takes its name from the famous cattle trail between Texas and Kansas where many a cowboy earned his spurs. The aim of the game is to get your herd from Texas to Kansas with as few losses as possible.

The game is available from TI dealers now at around £22.

THE GAME OF THE BOOK OF THE FILM...

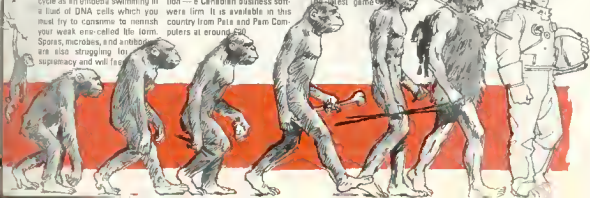
ETA.

The game of the film is the latest craze in computer gaming. The theory behind it is that if people will buy the book, record, T shirt and even jigsaw puzzle of the film then why not buy the game of the film too.

The TV games centre manufacturers were the first into this profitable new business with games for current box office money spinners ET and Tron.

Hot on the heels of Atari's ET comes a version for the Spectrum in 16K and 48K from Antimate of Southsea.

ET has crash-landed on Earth and has lost his memory. It's up to you to help him remember his name, and find his space craft before the wild dogs and evil military catch him. ETA is available at £5 from the Hampshire firm.



BBC MICRO INSTANT MACHINE CODE!

Yes, it's true. Instant machine code from a good subset of BBC BASIC. Type your BASIC program into your model B BBC Micro, trigger the compiler, and your program is changed almost instantaneously into superbasic machine code. For £34.95 you get, Cassette version of the complete compiler (along with a version of the compiler for use with discs, ready for when you upgrade, the disc version being dubbed on the cassette after the cassette version); complete compiler listing; extensive documentation and instructions. The compiler was written by Jeremy Ruston.

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By Tim Hartnell

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TRADE & EXPORT ENQUIRIES WELCOME

NEW PRODUCTS NEW PRODUCTS NEW PRODUCT NEWS

UP, UP AND AWAY WITH SPECTRUM

FLIGHT SIMULATION

Fly the flag with this latest flight simulator from Psion Software. The game is the most sophisticated flight simulation ever produced for a micro computer.

It represented a marathon programming exercise for the London based firm. It took over eight thousand man hours to complete with up to six programmers working on the project at any given time.

Many of the features of this flight program are straight from the cockpit of a Boeing 747.

The instrument landing system lines up a flashing dot with a cross which has been centred on the chosen airport.

All information systems are displayed as dials just as in a real plane. These tell you your altitude, rate of climb, speed, wind and weather conditions, and your position.

The game offers two screen presentations. The first of these shows the view from the cockpit with the instruments described above in the bottom of the screen and the view of the horizon in the top half of the screen. As the plane swoops down you can see land and lakes in the horizon appearing in front of you through the cockpit window.

The plane can be made to bank, roll, dive, climb and even loop the loop — though you will have to be a pretty good pilot to make it do this.

The second screen presentation shows a map with your plane flashing its rate of progress. The airports are represented as flashing beacons with the land and lakes shown.

Flight Simulation runs on a Sinclair Spectrum in 48K and is available from larger branches of W. H. Smith at £7.95.

Also new from Psion this month is a second Horace tape. The original Horace game featured the cute comic character running around a park being pursued by the attendants. They were chasing him because the

mischievous little glutton had just gobbled their sandwiches and eaten their prize winning daisies.

In this second episode Horace goes skiing. You have to get him across a busy road to the hut where he keeps his skis. Hebble back across the road with skis on and Horace can then begin his slide down the snowy slopes. Good luck Horace! Don't fall over!

Horace Goes Skiing runs on a Sinclair Spectrum in 16 or 48K and is in W. H. Smith stores now, at around £6.

GAME FOR A LAUGH ON THE ZX81

GAMES PACKS

Two new games packs for the ZX81 add another thirteen games to choose from to the now enormous range of games available for the daddy of micros.

Both tapes run on the unexpended machine in 1K.

You must provide an escort for the fuel ship and also light off stacks from hostile aliens. Each time a meteorite hits the force field, more of the city's precious supply of energy is used up.

If an enemy saucer penetrates your defences they will then be able to score a direct hit on Outworld. It only takes one bomb from a barbarian ship to destroy the civilisation.

Outworld is the latest game from Reading based Audiogenic for the Vic-20. The game is available at £34.95.



NEWCOMER MEETS OLD FAVOURITES

DRAGON GAMES

A steady trickle of new games manufacturers are beginning to sell games for the new Dragon computer.

Games Pack One — from John Morrison of Glendale Street, Leeds, is an example of some of the new software now coming available. The cassette features five well known games: Othello, Awar, Moonlander, Breakout and an original game, Raffles.

Raffles is a mini-adventure game where you have to explore a honeycomb of mysterious rooms searching for treasure.

John Morrison also offers two classic adventure games: Slag, and Worlock.

The above cassettes together with another Games Pack featuring Space Invaders, Lunar Lander, and a Centipede-type game are on sale now from the Yorkshire-based firm at £5.75.

Games Pack One features Air Sea Rescue, Invaders, Message Writer, Demon Driver, Breakout and Squash.

Games Pack Two features Jump Jockey, Asteroids, Invaders (part 2), Stunt Cycle, Noughts and Crosses, Enterprise and Sketch.

Both games are available from Database Software of Stoke-on-Trent at £4.75.

DEFENDING THE BLUE DREAMWORLD OUTWORLD

The architecture of the city of Outworld is amongst the most beautiful in the galaxy. It's tall blue buildings scrape the sky.

The city is the envy of several inferior races who seek to destroy it and deny the Outworldians their utopian life style.

Outworld's chief weakness is that it uses up vast amounts of energy to fuel the buildings and drive the protective force field which blankets the city.

DON'T GET CAUGHT ON THE HOP!

FROGS

Robb! Robb! He, my name is Frogs and I've just been hopped out of the arcades to become the latest game for the ZX81.

You can find me on the B side of the latest Psion game called Super Gloopier.

Frogs is a version of the popular arcade game Frogger in which you have to hop our here to the safety of the bank on the other side of the river!

In Super Gloopier you must paint in as much of the maze as possible before the guards catch you.

Also new from Psion this month and bringing a touch of arcade action to you: ZX81 is Thru the Wall and Scramble.

Thru the Wall is a version of the early arcade hit Breakout.

Super Gloopier and Thru the Wall are available from W. H. Smith at £4.95.

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—Pitfall Harry,
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PRESTEL

THE SHAPE OF THINGS TO COME

Prestel, as you may know by now, was a marvellous idea to send constantly updated information down the phone wire.

A small adaptor was plugged into your office phone line, and it turned telephone signals into the right kind of weak electric currents which you could feed into the aerial socket of an ordinary T.V. set. And the buzzes and whistles which came down the Prestel phone wire reconstituted themselves into pictures on your screen — showing stocks and share prices, or railways timetables, or the day's latest newswatches.

Now I'm talking about all this in the past tense, because those particular uses of Prestel are rather fading into history.

THE HOOK...

Prestel never really caught on with people sitting round the telly at home because static screens of information look rather boring, and there was nothing much on Prestel that you couldn't find out by simply looking in a newspaper — which is far cheaper than the £100-£150 or so which the phone-line adaptors would cost!

But now there's a new home-orientated use for the Prestel idea: instead of just sending pages of information to read off your screen — like the BBC's Ceefax, or ITV's Oracle — it's possible to send home-computer programs down the wire. And to make it cheaper for everyone to hook up to the service, British Telecom and the publishers of *Computer & Video Games*, EMAP have got together to provide a £49.95 phone-to-computer adaptor.

IN THE NET...

Programs will be available from January on this new service — which is called Micronet 800, "Micronet" because it'll evolve into a network for microcomputers, and "800" because that's the number which existing Prestel users tap into

Palmer Linton takes a break from our Prestel page this month as DAVID BASKIN brings you up to date on a brand new and exciting development — Micronet 800.



their keyboard to get to the Micronet area of Prestel.

The first few hundred programs on Micronet 800 will be for the BBC A and B micros, the Apple computers, TRS-80s, RML 380/480Z machines, and Commodore Pets.

Phone adaptors for these will be available straight away. And they'll be followed shortly afterwards by programs for the Sinclair machines, as Clive is due to make phone-to-Spectrum and phone-to-ZX81 adaptors available at the beginning of '83.

These adaptors are all (except for the Sinclair versions) what's called "acoustic modems" — acoustic means they operate by sound waves. So there's no direct attachment to the phone line; you just put your telephone receiver into the two plastic cups on the adaptor, and your micro and Prestel then talk to each other just like an ordinary human conversation!

Thus acoustic coupling cuts out the need to actually have British Telecom come round and add an extra "hard-wire" connection to

C&VG has come to a deal with Micronet over games programs and any you send in for whatever micro, we will pass onto the Micronet validation team. So, as well as seeing your program published in C&VG, you'll have a chance of earning royalties from Britain's latest electronic magazines.

your telephone system. And it also means there's no chance of any unusual voltages jumping back and forth between your computer and the phone line.

The choice of programs seems extremely varied, there'll be educational programs to use in schools and colleges, games programs similar to Pacman and space invaders and then out of the home league there'll also be business programs.

Acornsoft have put some of their BBC programs onto Micronet; Bug-Byte, Microdeal and Bridge Software are just some of the firms with ZX81 programs on the system.

These programs — and all the others from major distributors — will cost far less on Micronet than they do if you buy them in a shop or by mail-order.

There are also hundreds of free games on Micronet, and the chance to win big prizes.

THE SYSTEM...

The whole idea of this programs-down-the-phone-line excitement came about through carefully evaluating what goes into a proper purpose-built Prestel receiver.

It has a screen — but so has a home computer. It has an alphanumeric keyboard — and so, too, does every personal computer.

Some Prestel sets, only have a numeric keyboard, and these can't be used for sending messages to other users. With a home computer you can type electronic messages to all or any other Micronet user!

Home computers also have in-built memory, and cassette or disc recorders for storing information — so once a program has come down the line you can keep it for ever! Thus it was just one small logical step from using a home computer to process information, to using it to retrieve or receive that games-program information from a central Prestel or Micronet computer.

Incidentally, Micronet are paying a handsome 20% royalty on any programs of yours that they put on the system. Their address is Peterham House, 67a Hatton Garden, London EC1N 8JD.

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TAMING THE INVADERS

David Langford discovers that there is more than just one way to save planet Earth

Once again those vile space invaders hang in the sky. Once again they throb their evil way downward, and once again it's only your staggering marksmanship which can save Earth from being overrun.

Difficult, isn't it, to read these stirring words without suppressing a yawn? But there may be a new twist to the old game yet.

Since the days of H. G. Wells's *The War of the Worlds*, the trend in science fiction has been for our heroes *not* to zap the alien hordes on sight, but to try and establish some kind of communication.

For some strange reason games programs have lagged behind, perhaps because shooting space invaders seems more exciting, perhaps because it looks more difficult to program for communication.

We can keep the element of threat in a game of communication by remembering all those SF stories in which the tiniest misunderstanding leads to total and terrifying war.

In Joe Haldeman's novel *The Forever War*, it's just a small communication error which causes the thousand-year interstellar war between Us and Them.

A man in one of James White's stories tries to win the favour of cuddly aliens by kissing babies, but unfortunately the aliens assume that this Earthling caricature is merely hungry.

Rather more subtle is *Peace* by Ian Watson, where war is provoked only when humans ask the aliens to agree to a peace treaty.

The aliens' reasoning is, roughly, "If these humans are so barbaric and obsessed with war they need a special treaty to prevent them from fighting, it is clear that they are deeply in need of extermination."

Back to the keyboard. Imagine a program scenario in which an alien fleet advances slowly on you, waiting for intelligent signals but with its patience slowly dwindling, while the only weapon you have is some means of transmitting messages — plus, of course, your own gyanic intelligence.

This is a highly realistic situation, come to think of it. These are all the weapons most of us have against such loathsome beings from beyond the outer galaxies as the Inland Revenue, the Post Office, Customs & Excise.

In the listing as given here, you can bash out signals to the alien horde as fast as you like. Every so often another invader joins the fleet in the skies: eventually they'll overrun you by sheer weight of numbers.

But when one of your messages is such that the aliens decide you may be



intelligent, they pause and retreat a little.

If you can manage a whole series of "intelligent" signals to the invaders, then each successive signal will normally cause a bigger retreat until at last the sky is clear again — but a mistake may set you back to square one! It's up to you, then, to work against time and deduce what sort of simple messages can persuade the aliens to go away.

Beware: there are traps. Because aliens are deeply suspicious of mere repetition — you might only be a parrot — the same message will not work twice.

Obviously you can rewrite the program to change the type of intelligent signal for which it looks. A little study of the listing here will tell you the method used in my prototype program, though it won't help much if you want to cheat: in any case it's more fun to discover these things by playing the game than by analysing the listing.

You could easily alter the program to make the key signal a particular computer-generated key word, so the game would become something like Mastermind or Hangman played against time. Or perhaps the aliens themselves could

be made to send signals, to which you have to respond, following alphabetical or mathematical sequences which you must get right? Or, ultimately, the computer could generate an artificial alien 'language' in which they talk to you, your job being to decipher enough of it to send peaceful messages back — but perhaps the ideas are now getting a bit ambitious for a mere micro.

As usual, the listing is for a TRS-80, level II — but I'm buying another computer soon! As usual, you're encouraged to adapt the program to whatever other machine you may have — there are no particular subtleties.

Note that line 60 puts together the graphics for an invader. To make the game run faster, you can reduce the value of TM in line 2030 — beginners may prefer to increase TM and slow the game down. To increase the playing time — after which the aliens lose patience and swarm over you — increase the value of K in the same line.

So once again the enormous fleet of space invaders darkens the sky. Only you can save the Earth from being overrun. From deep in the armoured command base, you aim your mighty radio antenna and type: "Hello".

[illegible][illegible][illegible][illegible][illegible]

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Computers are well known to be weak at positional play, the intricate maneuvering for a small advantage, such as a well-placed Knight. However, they also have problems with tactical play, even with what seems like the simple task of finding forced checkmates in positions where they are known to exist.

Look at figure one. This is an example of a "White to play and mate in two moves" problem of the kind often found in newspapers and magazines.

The first point to note here is that the specification for White to mate in two moves has no practical value. Chess problems are not game positions but artistic compositions on the 64 squares of the chessboard.

Solving a chess problem is not a matter of examining every possible sequence, but of identifying the composers' theme in setting the problem.

The use of a computerized "mate in two" program using exhaustive analysis easily undercuts the aesthetic experience of problem solution.

Simply by considering every possible legal combination of two moves for White and one for Black, the program inevitably reveals the winning move. (The reader is left to discover the solution for figure 1 using either a computer or a human brain, as preferred.)

In finding checkmating sequences in positions that arise in practical play, very different methods need to be applied.

The longest variation in a checkmating sequence arising from play can easily be 7 or 8 moves (of each side) deep, so analyzing every possible combination as a general solving method is completely out of the question.

On the positive side, the moves in a checkmating sequence from play are usually fairly obvious ones of a forcing nature, such as checks and captures (or sacrifices of material) whereas those in composed problems are frequently "quiet" or unlikely moves, such as a Bishop move one square further away from the scene of battle, which are difficult to perceive even for strong over-the-board players.

The MATER program of George Baylor and Herbert Simon which appeared in the mid-sixties was an early pioneering attempt aimed at finding forced checkmates in game positions, given that they are known to exist, of necessity employing "Artificial Intelligence" rather than "brute-force" means.

Figure 2 is a fairly straight forward example of the positions solved by the first version of the program, MATER 1



The major difficulties with any such program are deciding what moves to consider and in what order, and at any point in the analysis deciding what to examine next.

Deciding when to stop analysing a line is probably the hardest task of all. A badly written program might spend many hours, days, even longer, looking at variations beginning 1. P-QR3, Q-R7; 2. K-Q2, Q-R8, 3. P-R4, etc., which humans would discount at a glance.

MATER's choice of moves to examine is simple but works quite well. At any move for White (assumed to be the winning side), only checks are considered and at every White move preference is given to the check which leaves Black the fewest legal moves in reply.

As will be seen below, this may involve abandoning the current line of analysis and starting another.

Any White moves which give Black more than four legal replies are automatically discarded. Any remaining choice amongst White moves is resolved by giving priority to double checks, then to checks with no capturing replies.

When it is Black's turn to move, all legal moves must be considered, but there is a considerable advantage in looking first at those moves which are the most likely to refute White's attack.

For this reason, MATER looks first at Black moves which capture as valuable a White piece as possible. If there is still a choice, King moves get priority

This is how MATER solves the position in figure 2.

1. Generate all White checking moves.
1. Q-B8ch has two legal replies. 1. N-K8ch has 3 and 1. B-7ch and 1. B-K7ch each have one.

2. Choose 1. B-K7ch (arbitrarily) from the last two for analysis, as the basis of reinitiating Black's replies.

3. Generate Black's forced reply 1... NxB.

4. Generate all White's checking moves. 2. N-K8ch is the only one and Black has three legal replies.

5. Choose a White move to examine next from those not yet considered. Candidates are 1. Q-B8ch (two replies), 1. N-K8ch (three replies), 1. B-7ch (one reply) and 2. N-K8ch (three replies).

The "best" one is 1. B-7ch as the previously played moves (1. B-K7ch, NxB) are refracted and 1. B-7ch is played instead from the original position.

6. Black's move is again forced, 1... NxB.

7. Generate White's checking moves. 2. N-K8ch (four legal replies) and 2. Q-B8ch (two replies).

8. Choose a move to consider next, from 1. Q-B8ch (two replies), 1. N-K8ch (three replies), 2. N-B8ch (four replies) and 2. Q-B8ch (two replies).

Since 1. Q-B8ch was generated first, it is chosen in preference to 2. Q-B8ch (both with two legal replies). So 1. Q-B8ch is now played in the original position.

9. Black now has a choice of two replies 1... NxB and 1. N-K2. The capture 1... NxB is tried first.

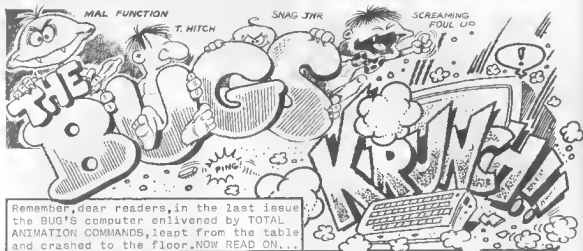
10. Generate White's legal moves; those include 2. B-K7 mate, which has no legal replies at all and is accordingly chosen to look at next.

11. Since 1... NxB was unsuccessful, Black's only other legal reply to 1. Q-B8ch is tried, namely 1... N-K2.

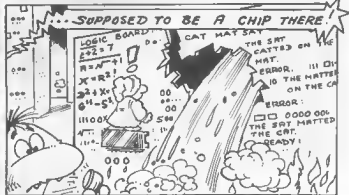
12. Generate White's legal moves; those include 2. BxKch which has no legal replies and is chosen to consider next. Since it has now been found that neither 1... NxB or 1... N-K2 avoids checkmate, White's winning first move is established to be 1. Q-B8ch.

Although figure 2 is quite a simple position and one that, in isolation, could have been solved by an exhaustive "mate in two" program, the same method embellished to consider other forcing moves as well as checks for White can solve many other problems for which an exhaustive search method would be completely inadequate in any reasonable amount of time.

BY MAX BRAMER



Remember, dear readers, in the last issue the BUG'S computer enlivened by TOTAL ANIMATION COMMANDS, leapt from the table and crashed to the floor. NOW READ ON...



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SAVING THE MACHINE ASSEMBLER

BLUEPRINT

What's got a machine, a monster and a beautiful maiden in distress. Blueprint — that's what.

This latest deviation on the maze game theme is a novel new video which may pick-up some followers around the arcades once they get the hang of just what is going on.

You, the player, control a little chap known as J.J. His job is to assemble a machine which once switched on will save Daisy Denzil from the clutches of Ollie Ogra.

All J.J. has to do is collect all the parts of the machine from little houses situated in a sub-



urban maze, and build them into a "blueprint" at the bottom of the screen. At the top of the screen Ollie Ogra mercilessly chases Daisy — getting closer as you play.

If J.J. enters a house more than once he comes out with more than he bargained for — a ticking bomb. This he must get rid of before it explodes — hopefully down Ollie's monster hole situ-

ated at the bottom right hand side of the screen.

The bombs prevent Ollie's monstrous metas from engaging in the annoying habit of ripping out and boncing up and down creating a snake which shakes your machine to bits and gives you the assembly job all over again.

There are other dangers for J.J. to overcome, Ollie's metas, Sneaky Peter and Frizzy Wozzy appear to chase him around the maze and prevent him completing the machine and saving Daisy.

If J.J. manages to get all the parts in the right place and gets to the machine's on switch then a deluge of beach-balls are fired at Ollie — and if he is hit the story ends happily.

All in all it's a nice game — but you'll need a good few cricks at it before you get the drift of Blueprint.



You've heard of the game of the film — now see the film of the games.

Well, actually it's a video cartridge of a film which seems to have drifted into obscurity after playing second-fiddle to a horror movie while out on general release recently.

Called Arcade Attack it's an interesting semi-documentary concerned with the battle between the merits of pinball and video machines.

There's a lot of classic shots of pinball machines — many loaned by Pinball Owner's Association members — and a fascinating interview with an ace Defender player, who regards the Swimmers, Mutants and other nasties which inhabit this video game as sentient beings.

And finally a charming animated section at the end of the video film which depicts characters from pin table designs lighting it out with video-inspired scenes. £15 for 28 minutes.

THE SEA-SCAPE WITH A 3D FEEL

The third dimension is the current plaything which video game companies are flirting with.

Moving on from the 3D look of Zaxxon comes the 3D feel of Subroc-3D.

This space and sea warfare comes on a stand-up cabinet and a cockpit. Like Battle Zone you have to watch the game through a small binocular eye-panel which opens out onto the main screen.

You look out on a seascape filled with futuristic shipping fleets and a sky inhabited by

SUBROC-3D

flying saucers and speeding space ships.

The action appears to you as though you are looking through the cockpit of your Subroc fighter and the screen reacts to your tugs on two handles which pop out periscope-like from the eye-panel.

A fire button lets you reply to the barrage of fire which your ship is undergoing as all sorts of bombs and missiles are hurled towards you: torpedoes threaded through the ocean while rockets fill the skies.

The ultimate challenge is the flying Command Ship with its awesome firepower and protective shields.

Stereo sound adds to the effect and so do changes in the skies to show day and night, dawn and dusk backdrops to the action. I found my initial response to be one of confusion, but Subroc-3D is undoubtedly the shape of games to come.

DUAL AERIAL DUELS

JOUST

Take to the air on an ostrich, armed with a lance and battle with a band of buzzard-mounted evil-doers.

Joust takes place in a realm of sheer fantasy and its brand of peculiar aerial combat takes place between either one or two players and the machine.

Dual controls for the dualists encourage the two-player version as higher scores are possible when the players take part in tandem against each other and the machine itself.

Mounted on either an ostrich or a stork, each player mans a flip button and a joystick. He flies his bird towards the enemy riders and attempts to unseat them.

A successful Joust scores points and turns the enemy into

an egg which must then be picked up before it hatches into an even more deadly opponent.

The Jousts take place between suspended outcrops of rock over which the combatants flap. Other features include a deadly pterodactyl which swoops down to engage the players, fire consumes the rock bridges leaving less space to land, and a lava troll takes shape, reaching up to grab anything which flies over its den.

The second, seventh, 12th — and so on — waves are termed Survival Waves where players are rewarded for not losing riders and every fifth wave is an egg wave with extra points to be won. Weird and wonderful!



GAPPING GUIDELINES

Outline encourages you to improve rapidly as you learn your way around its many courses.

Remember that the sparks travel at the same speed you do and when only one is on you trail there should be no problems if you keep moving. He can't catch you up and you can't get trapped anywhere.

Outline offers a joystick and a "gap" button as the controls. The joystick takes some getting used to because it needs constant pressure to keep moving. While the gap button should not be used for the fast few screens as it only complicates matters.

Like all maze games, once you have got a procedure for beating each screen, you should memorize it and stick with it.

Gapping breaks the line behind you but in corners it can lead to problems as you can gap yourself in behind two barriers. The gap lasts for several seconds before the diagram completes itself again.

It is possible to start at different levels in Outline but score and practice suggest it is best to start from the first level. This presents you with a "+" like shape and a single spark. Memorize the spark's early movements and learn just what to expect.

Flashing bonus scores can tempt you off your chosen path and into trouble but are worth three times the score.

The second screen "T" shape only threatens in the long central leg of the "T" where a careless player can get trapped.

The third diagram is the simplest, an "X" shape consists of five squares connected by one solitary line. The best method is to begin at a corner square and when the spark follows you up, leave with a gap behind you,

OUTLINE TIPS

stranding the spark in the corner.

The fourth diagram resembles a distorted "M" and the problems are increased by a second spark. These have a nasty habit of trying to trap you down one of the two long legs of the "M".

When sparks are after you, they tend to follow the "X" coordinate first, so a staggered pattern will often cause the spark to career along a horizontal line above you rather than following you down or up.

Another way to take advantage of the spark's no "U" turn policy is to follow behind it.

Wall features a huge grid covering the whole screen with two sparks. The time bonus will often beat you on this wall.

If you do, then it's back to the "X" shape with two sparks and then onto a distorted "M" with two sparks which fire test-moving missiles at you.

The game progresses through the missile firing screens onto invisible mazes which only show the scores, not the lines. At level 13 you are introduced to the rocks which can hide you from the sparks and in the final wall, No. 20, a super fast spark adds to the problems.

A CAST OF MINNOWS

Angler Dangler gives every fisherman a chance to see the one that got away.

This fishing game sets you down on a bank with rod and line and a rough idea of where that big fish might lie.

The indication is given on a radar screen which runs the length of the lake and the big fish flash up on it as they swim between the banks of reeds.



QUEST FOR THE RED PLANET

GRAVITAR

You plot your own intergalactic course through Gravitar's deepest space in the quest for the Red Planet.

Your mission is to collect fuel from the minor planets in the solar system and then storm the Red Planet with its subterranean passages.

Gravitar is a new concept in lunar landing games as it shows you progressively closer pictures of your approach to the planet.

In deep space your only worries are the Death Star — which will try to pull you into its field of gravity — and two pursuing craft sent after you by the Red Planet.

It one of these ships should come too close, the screen enlarges to allow you both to manoeuvre in a dogfight.

Arriving at a planet, your screen changes to show a close up of your craft descending. Soon the features of the planet are discernible. These include rocky mountainscapes usually studded with red bunkers which protect the blue fuel cells.

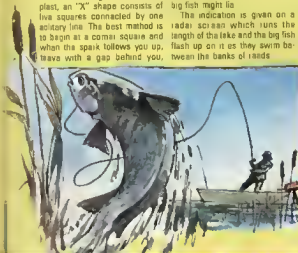
Taking care to avoid the bunkers' fire, you must manoeuvre over the fuel cell and switch on your tractor beam to fill up with fuel.

The tractor button doubles as a shield button to help you repel enemy fire but each time you use it or the thrust button, fuel is depleted.

Points are scored for success fully landing a planet in the given time limit, destroying enemy bunkers, collecting fuel and shooting red ships.

The Red Planet challenges you to guide the ship down into a spiral cavern where a clock ticks down on a reactor. Having survived the tunnel journey you must blast the reactor and escape from the tunnel, all in under 23 seconds. If the mission is successfully completed you are taken through to another universe.

Gravitar resembles Asteroids in design and controls. With single lines representing planet surfaces, ships and planets. The controls are buttons for left and right rotation, fire and thrust buttons and a dual purpose, shield/tractor beam button.



Take-off for far away places with strange sounding names at the controls of a giant jumbo jet.

Will you be able to pilot the huge jet and land it safely? You'll

soon know once you've programmed in this flight simulation which will test your skills to the limit.

By gradually lowering your speed and altitude you have to

achieve a safe landing in five sequences. The computer will ask you for the relevant instructions on your run-in to the airstrip. Lowering your airspeed of altitude by too much will

cause the jet to stall. Can you keep the jet and your passengers on the straight and narrow? There are two skill levels and impressive graphics to enjoy.



AIRLINE PILOT

BY B. SUMMERHAYS

RUNS ON A SHARP MZ80K IN 32K

```

10 REM COPYRIGHT BY B. SUMMERHAYS 1982
11 PEN WHITEWAYS MIDDLE SHEFFIELD 4
20 T1$="000000"
25 PRINT "B"
30 PRINT "AIRLINE PILOT"
40 IF T1$="000000" THEN GOTO 60
50 GOTO 25
60 PRINT "B"
61 PRINT "AIRLINE PILOT by B.S."
70 PRINT "
80 PRINT "You are the pilot of a Jumbo Jet."
90 PRINT "By gradually lowering speed and"
100 PRINT "altitude you must achieve a safe"
110 PRINT "landing in 5 sequences."
120 PRINT "Wind speed is added onto airspeed"
130 PRINT "in each sequence. A minus windspeed"
140 PRINT "denotes wind against and will slow"
150 PRINT "you down accordingly."
160 PRINT "LOWERING AIRSPEED OR ALTITUDE B/"
170 PRINT "TOO MUCH CAUSES A STALL OR A SPIN!"
1790 PRINT "RND(10)+1000)+4000
800 PRINT "PRESS H FOR HARD GAME, N FOR NORMAL"
810 GET$
820 IF $="H" THEN GOTO 810
830 IF $="N" THEN RND(10)+1000
900 T1$="000000"
1000 D=40
1010 W=INT(RND(10)*40)+20
1020 X=INT(RND(10)*6)+1: IF X=3 THEN W=W
1030 F=INT(RND(10)*50)+200
1040 S=INT(RND(10)*100)+400
1050 PRINT "B"
1060 PRINT "FLIGHT BA 103"
1070 PRINT "
1080 PRINT "
1090 PRINT "
1100 PRINT "
1110 PRINT "
1120 PRINT "
1130 PRINT "
1140 PRINT "
1150 PRINT "
2000 PRINT "DISTANCE: D Miles to runway"
2010 PRINT "WIND SPEED: W knots"
2020 PRINT "FUEL LEFT: F Gallons"
2030 PRINT "AIRSPEED: S knots"
2040 PRINT "ALTITUDE: A feet"
2050 S=S+W
2060 PRINT "DECREASE SPEED BY ? KNOTS": INPUT B
2070 S=S-B
2080 F=F-(B/2)
2090 IF B=150 THEN PRINT "ENGINES STALLED": GOTO 7000
2100 FOR I=1 TO 300
2110 PRINT "DECREASE ALTITUDE BY ? FEET": INPUT C

```

```

2120 IF C=150 THEN PRINT "YOU ARE IN A SPIN": GOTO 7500
2130 A=A-C
2140 GOSUB 9000
2150 E=INT(RND(10)+10)+1
2160 IF E=6 THEN A=A-(E*100)
2170 IF E=6 THEN PRINT "SEVERE TURBULENCE YOU MUST ASCEND" + (E*100) "FEET"
2180 PRINT "
2190 PRINT "
2200 PRINT "
2210 PRINT "
2220 PRINT "
2230 PRINT "
2240 PRINT "
2250 PRINT "
2260 PRINT "
2270 PRINT "DISTANCE 30 miles to runway"
2280 D=D-30
2290 PRINT "WIND SPEED: W knots"
2300 PRINT "FUEL LEFT: F Gallons"
2310 PRINT "AIRSPEED: S knots"
2320 PRINT "ALTITUDE: A feet"
2330 PRINT "DECREASE SPEED BY ? KNOTS": INPUT B
2340 S=S-B
2350 IF B=150 THEN PRINT "ENGINES STALLED": GOTO 7000
2360 W=W+B
2370 S=S+W
2380 PRINT "DECREASE ALTITUDE BY ? FEET": INPUT J
2390 IF J=150 THEN GOTO 7500
2390 A=A-J
2395 GOSUB 9000
2400 K=INT(RND(10)+10)+1
2410 IF K=3 THEN PRINT "YOU HAVE A FUEL LEAK." + (K*10) "GALLONS LOST"
2420 IF K=3 THEN PRINT "YOUR HOSTESS HAS BROUGHT YOUR COFFEE"
2430 IF K=3 THEN F=F-(K*10)
2440 F=F-(K*5)
2450 IF F=0 THEN PRINT "NO FUEL LEFT": GOTO 8000
2460 PRINT "
2470 PRINT "
2480 PRINT "
2490 PRINT "
2500 PRINT "
2510 PRINT "
2520 PRINT "
2530 PRINT "
2540 PRINT "
2550 PRINT "
2560 PRINT "DISTANCE 20 miles"
2570 D=D-20
2580 W=W+K
2590 PRINT "WIND SPEED: W knots"

```



Don't bother guessing which programs our members are saving money on this month.

If you use a BBC, Dragon, Spectrum, VIC or ZX81 computer and you are not yet a member of THE MICROCOMPUTER SOFTWARE CLUB, then only those with the VIC can be forgiven. We have only just added the VIC to our coverage.

Membership of The Microcomputer Software Club would save you money and trouble. Each month we thoroughly test and evaluate the many programs issued by the growing number of producers including Pixel, IJK, Bug-Byte, A & F, Campbell, C-Tech, and the smaller companies that you may find it difficult to keep track of. If a program is good, and it has got to be very good, it is recommended to our members in the next issue of the Newsletter.

All the programs that we recommend are made available to our members at very low prices. For example, a Bug-Byte program usually costing £10.00 would be offered to members at £9.00 or less. A saving of at least 10%. Every month we select what, in our opinion, is the overall best program for each computer and this MAIN CHOICE program is offered to members, for one month only, at an average 20% less than the normal price. A MAIN CHOICE program usually costing £6.00 would, therefore, be available to members at about £4.80.

Every month members receive, free of charge, our Newsletter full of information on the programs we have found suitable for recommendation. The range is large, including adventure, arcade, standard games, household, financial, educational, wordprocessing, and utilities. Ordering from the Newsletter is simple and quick and, of course, quality is guaranteed.

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```

2700 PRINT"BFUEL LEFT":F1:"gallons"
2710 PRINT"BAIRSPED":S1:"knots"
2720 PRINT"BALTITUDE":A1:"Feet"
2730 PRINT"DECREASE SPEED BY ? KNOTS":INPUT
2740 S=S-L
2750 IFL 100THENPRINT"ENGINES STALLED"
2760 IFL 100THENGOTO7000
2770 IFS 50THENPRINT"ENGINES STALLED"
2780 IFS 50THENGOTO7000
2790 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTM
2800 A=A-M
2810 IFA 500THEN GOTO 8000
2820 IF M 1200THENPRINT"YOU ARE IN A SPIN"
2830 IFM 1200THENGOTO7500
2840 F=F-L 4
2845 GOSUB9000
2850 H=INT(PHD(10)*10)+1
2860 W=W+M
2870 D=D+100
2880 IFN 5THEN PRINT"HEAVY CLOUD: AUTO-PILOT LOSES YOU":O:"FEET OF ALTITUDE"
2890 IFN 5THENA=A-O
2900 IFK 3THENPRINT"FIRE IN NO.1 ENGINE. YOU LOSE AIRSPEED":O:FV=102000:NEXT
2910 IFK 3THENS=S-67
2920 IFS 60THENGOTO7000
2930 PRINT"PRESS ANY KEY FOR FINAL APPROACH"
2940 GETZ
2950 IFZ="" THENGOTO2940
2960 PRINT"B"
2970 PRINT"
2980 PRINT"
2990 PRINT"
3000 PRINT"
3010 PRINT"
3020 PRINT"
3030 PRINT"
3040 PRINT"
3050 PRINT"
3060 PRINT"DISTANCE:10 miles to touchdown"
3070 D=D-10
3080 W=W-14
3090 PRINT"WIND SPEED:W:"knots"
3100 S=S-U
3110 PRINT"BFUEL LEFT":F1:"gallons"
3120 PRINT"BAIRSPED":S1:"knots"
3130 PRINT"BALTITUDE":A1:"Feet"
3140 PRINT"DECREASE SPEED BY ? KNOTS":INPUTP
3150 IFP 120THENGOTO7000
3160 S=S-P
3170 IFS 50THENGOTO7000
3180 PRINT"DECREASE ALTITUDE BY ? FEET":INPUTQ
3190 IFQ 1500 THENGOTO7500
3200 A=A-Q
3210 IFA 200THENGOTO7500
3220 F=F-(S 4)
3230 IFF 4THEN PRINT"NO FUEL LEFT"
3240 IFF 4THENGOTO7500
3245 GOSUB9000
3250 E=INT(PHD(10)*10)+1
3260 W=W-E
3270 IFC 4THENPRINT"ELECTRIC STORM DETOUR COSTS 54 GALLONS OF FUEL"
3280 IFC 4THENF=F-54
3290 IFE 5THENA=A-500
3300 IFE 5THENPRINT"HIJACKER HAS BLOWN A HOLE IN THE FUSELAGE"
3310 IFE 5THENFV=102000:NEXT
3320 IFE 5THENGOTO7500
3320 PRINT"PRESS ANY KEY TO LAND. PRESS ANY KEY"
3330 GETZ
3340 IFZ="" THENGOTO3330
3350 PRINT"B"
3360 D=D-10
3370 PRINT"
3380 PRINT"
3390 PRINT"
3400 PRINT"
3410 PRINT"
3420 PRINT"
3430 PRINT"
3440 PRINT"
3450 PRINT"
3460 PRINT"
3470 PRINT"
3480 PRINT"
3490 PRINT"
3500 PRINT"
3510 PRINT"
3520 PRINT"
3530 PRINT"
3540 PRINT"
3550 PRINT"
3560 PRINT"
3565 R=E*10
3570 PRINT"PRIMARY BELOW, LANDING SPEED SHOULD BE "I1:"knots"
3580 PRINT"ACTUAL SPEED IS":S1:"knots"
3590 PRINT"ALTITUDE SHOULD BE 0 FEET"
3595 D=D
3600 PRINT"ACTUAL ALTITUDE IS":A1:"Feet"
3600 PRINT"ACTUAL ALTITUDE IS":A1:"Feet"
3610 F=F-39
3620 PRINT"BFUEL LEFT":F1:"gallons"
3630 IFF 1THENGOTO7000
3640 PRINT"DECREASE SPEED BY ? knots":INPUTT
3650 IFT 90THEN GOTO7000

```

```

3660 SPS-T
3670 IF(<X)THEN GOTO 00000
3680 PRINT "DECREASE ALTITUDE BY ? FEET": INPUT
3690 IF U > 100 THEN GOTO 07500
3700 A=A-U
3800 IF A < 0 THEN GOTO 08000
3850 GOSUB 9000
3900 GOTO 05000
3900 PRINT "B"
4010 PRINT " "
4020 PRINT " "
4030 PRINT " "
4040 PRINT " WELL DONE " "
4050 PRINT "SAFE LANDING" "
4060 PRINT "B"
4070 PRINT "I"
4080 PRINT "I"
4090 PRINT "I"
4100 PRINT "I"
4110 PRINT "I"
4120 PRINT "I"

```

```

5140 PRINT "YOUR PILOT RATING IS :T18:
      FAILTS:<000000 IS PERFECT)"
5150 PRINT "LESS THAN 000120 IS VERY GOOD"
5160 PRINT "ABOVE 000500 IS POOR"
5170 PRINT "ANOTHER FLIGHT"
5180 GET #1: IF Z#"" THEN GOTO 05100
5190 IF Z#"" THEN GOTO 060
5200 IF Z#"" THEN GOTO 010000
5210 GOTO 010000
7000 PRINT "S"
7010 PRINT "EMERGENCY"
7020 X=53240
7030 POKEX+410.05
7040 POKEX+411.14
7050 POKEX+412.07
7060 POKEX+413.07
7070 POKEX+414.14
7080 POKEX+415.05
7090 POKEX+416.19

```



```

7100 POKEX+417.64
7120 POKEX+418.19
7130 POKEX+419.20
7140 POKEX+420.01
7150 POKEX+421.01
7160 POKEX+422.12
7170 POKEX+423.05
7180 POKEX+424.04
7190 FORN=ITO3000:NEXT
7200 GOTO7500
7290 PRINT"B"
7300 PRINT"B"
7501 PRINT"000EFFECTIVECY"
7510 PRINTTAB(10)":"STATE OF DESCENT TOO GREAT"
7520 PRINTTAB(15)":"YOU ARE IN A SPIN"
7522 TEMP0?
7523 MUSIC="B"
7530 FORM=ITO3000:NEXT
7600 PRINT"B"
7610 E=INT(RND(10)*0)+1
7611 PRINT"000 DONT PANIC!!!"
7615 PRINT"000PANIC BUTTON"
7616 PRINT" "
7617 PRINT"ONE AND ONLY ONE OF THE NUMBER"
7618 PRINT"BUTTONS WILL SAVE YOU"
7619 PRINT"PRESS ONE NOW (I TO 9)"INPUTZ
7630 PRINTZ
7640 IFZ=E THENPRINT"YOU ARE BACK ON COURSE"
7645 IFZ=E THENFORM=ITO3000:NEXT
7650 IFZ=E THEN B=4000
7655 IFZ=E THENGOTO3000
7660 IFZ=E THENPRINT"HARD LINES, IT WAS"EI"THIS TIME"
7665 FORM=ITO2000:NEXT
7670 GOTO0000
7700 PRINT"B"
7905 PRINT"00000 NO FUEL LEFT"
7910 PRINT" "
7915 PRINT"DONT START READING ANY LONG BOOKS"
7916 PRINT"000ALL POWER LOST, ALL ENGINES DEAD"
7920 FORM=ITO3000:NEXT
8000 PRINT"B"
8010 V=INT(RND(10)*4)+1
8020 IFV=1 THENVS="INTO THE SEA"
8030 IFV=2 THENVS="INTO A MOUNTAIN"
8040 IFV=3 THENVS="INTO A SEWAGE WORKS"
8050 IFV=4 THENVS="INTO A CONCRETE FACTORY"
8060 IFV=5 THENVS="INTO A CUSTARD FACTORY"
8070 PRINT"0000 DISASTER!!!"
8080 PRINT"000000 YOU HAVE CRASHED "
8091 PRINT"0010 say the least"
8092 IDNR00
8093 MUSIC=C6P2C4R1C4R1C6R1#D4RID4R1D4R1C4R1C4B4R1C6"
8100 PRINT"000TRY AGAIN?"
8200 GETZ=:IFZ="":THENGOTO8200
8300 IFZ="V" THEN GOTO 60
8350 GOTO10000
8375 PRINT"B"
9000 PRINT"B"
9010 PRINT" VIDEO SIMULATION-SIDE VIEW "
9020 PRINT" "
9030 PRINT""
9031 PRINT""
9032 PRINT""
9033 PRINT""
9034 PRINT""
9035 PRINT""
9036 PRINT""
9037 PRINT""
9038 PRINT~~~~~
9039 PRINT~~~~~
9050 PRINT~~~~~
9060 PRINT~~~~~
9070 E=33248
9075 USR(62)
9080 IFD<41 THENPOKEE+315,196
9091 USR(62)
9090 IFD<31 THENPOKEE+345,196
9091 USR(62)
9100 IFD<21 THENPOKEE+380,196
9101 USR(62)
9200 IFD<11 THENPOKEE+418,196
9201 USR(62)
9300 IFD<11 THENPOKEE+495,196
9301 USR(62)
9350 FORM=ITO4000:NEXT
9375 PRINT"B"
9400 RETURN
10030 PRINT"000000000THANK YOU FOR FLYING WITH US,GOODBYE."
10040 PRINT"B"
10050 GOTO10000
10060 END

```

BY R. M. STEVENSON

Golf

RUNS ON A BBC MODEL B IN 32K

"Fore! Ah, hello old chap. Out for a spot of golf then ah? Wonderful sport, what! Lots of fresh air and exercise. But sometimes you will find yourself stuck in the office for an afternoon. Or the weather will be so absolutely foul you won't be able to even lift a club for days!

That's where these computer chappies come in useful. They've got golf off to a tee on the old micro. Jolly good when you can't get down to the links... oh, excuse me, jolly old ball seems to have got lodged in the branches of that pine tree. Bye for now!"

This program includes all the ailments of the real game. Bunkers, greens, and even the dreaded "rough". You can tell the computer how many holes you wish to play and it sets up the course for you.

It will ask you which direction you wish to make your shot to the green, and how hard you wish to hit the ball. The direction is calculated from 0 to 12 as in the hands of a clock, and strength by inputting a value from 0-100 which will represent the distance the ball travels in yards.

If you get into the trees you incur a penalty shot. If you get stuck in the rough you will have to hit your ball four times as hard as normal. If you land in a bunker you'll need to adjust your hitting power up to five times more than normal.

Good luck, good hitting, and we'll see you back at the clubhouse!

The following alterations are required to run the program on a model A machine. Change line 10 and 110 to read MODE 4. Change line 115 to read COLOUR 1. In line 120, 121 and 123 remove all the COLOUR statements and the colons immediately following them. Change line 270 to read COLOUR 1.

In line 1026 remove the COLOUR 0 statement and the colon immediately following it. Change the MODE 1 and COLOUR 2 statements in line 1340 to read MODE 4 and COLOUR 1 respectively.



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3. ARROW OF DEATH (Pt 1) — A blight has fallen on your home lands, the Baton has become tarnished and now radiates a malevolent aura of Evil. Your mission is clear — trace the source of this Evil and destroy ... or be destroyed. This is the first part of an Epic Adventure although each part can be played as a stand alone scenario
4. ARROW OF DEATH (Pt 2) — You now have the means to destroy your enemy but you are far from home and this land is strange to you. Can you cope with the deadly perils which approach you and have you the strength to see your mission through to the final conflict?
5. ESCAPE FROM PULSAR 7 — Alone on a gigantic Space-Freighter ... The rest of your crew have died horribly at the hands of a mutated Zoo-Specimen. Your only chance of escape is to reach the Frail Shuttlecraft. But the lurking Monster is hungry and you are the only food it has left
6. CIRCUS — Your Car has run out of Petrol on a lonely road miles from habitation. As you fudge reluctantly down the road in search of help you are suddenly confronted by an amazing sight. In a nearby field is a Huge Circus tent! But this is no ordinary Circus as you will soon discover.
7. FEASIBILITY EXPERIMENT — Far across the gulfs of time and space, a dying race of super-intelligent beings search the Universe for a Hero to save their existence ... At length their thoughts turn to planet Earth. You are chosen to be their saviour in a bizarre scenario where death is a mere thought away.

* Adventures 5, 6 and 7 require 32K RAM

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[illegible]

BY STEPHEN SHAW

POMPEII

RUNS ON A T.I. 99/4 OR 99/4A IN 16K IN EXTENDED BASIC

In the ashes of Pompeii, the ancient Roman city devastated by a volcano, some gaming counters, in the shape of trussed up chickens, were found.

There appear to have been 15 counters in a set with Roman numerals I to XV on one side and the other blank. Historians think that they may have been used with a box with 12 compartments.

Stephen Shaw has delved back into history for this latest brain-teasing program — based on an adaptation of the ancient Roman game produced by Whittlecraft at Worcester.

Rules of the game are included as DATA statements in the program and, says Stephen, should be sufficient for play.

Program notes:

- 120 Begins program in case of serious error—eg, syntax errors. You are advised to insert this line ONLY when the program has proved to be running OK. Otherwise you miss the error messages!
- 140 Warning messages are not displayed. The program will continue. BREAK is not totally disabled but can only be used when the machine is waiting for an input.
- 180 Defines characters 100-102 as the horizontal and vertical lines of the grid and the connecting points (102).
- 210 VALIDATE will only permit you to enter a Y or N. If you just press ENTER an N is assumed in this prog.
- 240 Draw 4 horizontal lines.
- 250 Draw 5 vertical lines.
- 270 Put a + in where they join.
- 280-300 Put the numbers 1-12 in the boxes.
- 320 Display the counter numbers on the left-hand side of screen.
- 330-340 General screen information.
- 350 CT(X,1)= numbered side of counter
- CT(X,2)= blank side of counter
- CTR(X,1)= result of throw
- CTR(X,2)= has counter been thrown this round?
- Both ctr(x,1) and ctr(x,2) are here set to record the result of the throw, which is then displayed.
- (For other computers use CTR(X,1)=CT(X,1) ; CTR(X,2)=CTR(X,1) if you don't have multiple assignments)
- 360 Tells comp all compartments are free for use.
- 380 When necessary changes the player (P).

- 430 Checks to see if counter can be used.
- 490 If only one counter is to be used checks to see if compartment can be used.
- 500 Tells computer the compartment has been used and deletes the compartment number from the screen. Arrays RR(n) and C(n) contain the screen locations of the compartment number n.
- 620-640 Reset counters (ONE & TWO) as appropriate if they cannot be used.
- 680 Have all layout counters been used (10 to T01-T10).
- 680 Refresh any counters which have not yet landed number up in this round.
- 700-720 Have NO counters landed face up this time? Then score. Scoring routine: total value of unused layout counters gives to T01 while total value of unused commitments goes to T0N.
- 740-800 If one score exceeds 100 and player 2 has just completed a round (scores no display) change to player 1! then evaluate the scores.
- 820-870 Final scoring & evaluation.
- 940 Run again. If you do not have RUN as a command then reset scores as shown and use GOTO 1040.
- 970 If thermal printer has been selected but is not connected or switched on, the line will send you to 1030 for a message and then you will go back to the initial selection of line 920. Otherwise life would be difficult! The error line is amended then to line 910.
- 1030 Ensures you do not have continuous scrolling just one screen at a time.

Illustration: Dorcas Cross



USE IF ONLY ONE # IS USED

USE . IF ONLY ONE # IS USED

```

100 REM
110 REM POMPEII - FOR 99/4
IN EXTENDED BASIC BY S
STEPHEN SHAW © 1982
120 ON ERROR 130
130 CALL CHAR(104,"FF80BE8888B88
OFF017D417D057D01FF") : SJ$ LOGO
140 ON WARNING NEXT :: ON BREAK
NEXT
150 CALL CLEAR :: RANDOMIZE :: D
IM CT(15*2),CTR(15*2),BX(12),PR(
12),CC(12)
160 DISPLAY AT(2,10):"POMPEII" :
: P=1
170 DISPLAY AT(4,1):"FOR 99/4 BY
STEPHEN SHAW"
180 CALL CHAR(100,PPT$("&0",14)&
FF"&PPT$("&01"&8)&PPT$("&01",7)&
F")
190 CALL HCHAR(6,15,104):: CALL
HCHAR(7,15,105)
200 DISPLAY AT(18,1):"WOULD YOU
LIKE INSTRUCTIONS?" :: DISPLAY A
T(19,10):"Y-N"
210 ACCEPT AT(19,15)BEEP SIZE(1)
VALIDATE ("Y")::A$
220 IF A$="Y" THEN 300 ELSE 1080
230 REM SET UP PLAY FM 240
COUNT FROM 340
240 CALL CLEAR :: FOP R=2 TO 11
STEP 3 :: CALL HCHAR(P,16,100,16
):: NEXT F
250 FOP V=15 TO 31 STEP 4 :: CAL
L VCHAR(3,V,101,9):: NEXT V
260 CALL HCHAR(1,12,104):: CALL
HCHAR(2,12,105) LOGO
270 FOP P=5 TO 11 STEP 3 :: FOR
V=19 TO 31 STEP 4 :: CALL HCHAR(
P,V,102):: NEXT V :: NEXT R
280 FOP R=1 TO 4 :: CC(P)=13+4*P
:: RR(P)=4 :: CALL HCHAR(4,CC(P
)+1,R+48)
290 CC(P+4)=13+4*R :: PR(R+4)=7

```

```

300 CC(P+8)=13+4*P :: FR(R+8)=10
:: NEXT R :: CALL HCHAR(10,18,5
7) :: CALL HCHAR(10,21,49) :: CALL
HCHAR(10,22,48)
310 DISPLAY AT(10,23)SIZE(2):"11
" :: DISPLAY AT(10,27)SIZE(2):"1
2" ! BOARD DRAWN & NUMBERED
320 FOR X=1 TO 15 :: DISPLAY AT(
1,1)SIZE(3):USING "##":X :: NEX
T X
330 DISPLAY AT(13,10):"SCORE:"&
P$ (1) :: DISPLAY AT(14,17):P$(2)
:: DISPLAY AT(13,26):STR$(SCORE(1
)) :: DISPLAY AT(14,26):STR$(SCOP
E(2))
340 DISPLAY AT(16,10):"PLAYING:"
350 FOR X=1 TO 15 :: CT(X,1)=X ::
CT(X,2)=0 :: CTR(X,1)=CTR(X,2)
=CT(X,INT(RND*2)+1) :: DISPLAY AT
(X,4)SIZE(2):USING "##":CTR(X,1)
:: NEXT X
360 FOR X=1 TO 12 :: B$(X)=X ::
NEXT X
370 DISPLAY AT(21,1):"ENTER CEPO
TO TERMINATE"
380 IF TOT=0 THEN 390 :: CALL IO
UND(660,660,0) :: P=P+1 :: IF P=3
THEN R=1 ! CONTINUE PLAY FROM H
ERE
390 DISPLAY AT(16,18)SIZE(10):P$(
P)
400 DISPLAY AT(24,1):"USE . IF O
NLY ONE # IS USED"
410 DISPLAY AT(18,1):"WHICH COUN
TERS? " :: DISPLAY AT(19,1)SIZE
(32):"FIRST:"
420 ACCEPT AT(19,7)BEEP VALIDATE
(DIGIT)SIZE(2):ONE :: IF ONE=0 T
HEN 640
425 IF ONE=15 THEN GOSUB 1130 ::
GOTO 410
430 IF CTR(ONE,1)=ONE THEN DIS

```

```

LA AT(19,1): "NOT AVAILABLE
" :: GOSUB 1130 :: GOTO 410
440 CTR(ONE,1)=0 :: DISPLAY AT(0
NE,4 SIZE(2):USING "###":CTR(ONE,
1)
450 DISPLAY AT(20,1): "SIGN (+ -
OR )"
460 SG$=" " :: ACCEPT AT(20,20)B
EEP SIZE(1)VALIDATE( "+-." ):SG$ :
: IF SG$=" " OR SG$="." THEN 460
470 IF SG$="." AND ONE>12 THEN C
ALL HCHAR(20,1,32,32):: CTR(ONE,
1)=CTR(ONE,2):: DISPLAY AT(ONE,4
SIZE(2):USING "###":ONE :: GOTO
410
480 IF SG$="." THEN 510
490 IF SG$="." AND B(ONE)=ONE T
HEN BX(ONE)=0 :: CALL HCHAR(PR(0
NE,CC(ONE),32,2):: CALL HCHAR(2
0,1,32,32):: GOTO 410
510 IF SG$<"+" AND SG$>"-" THE
N 410 : SG$ NOW= + OR -
520 DISPLAY AT(20,22): " " :: ACC
EPT AT(20,24)SIZE(2)BEEP VALIDAT
E/DIGIT:TWO
530 IF TWO>15 OR CTR(TWO,1)< TWO
THEN DISPLAY AT(20,1): "NOT AVAI
LABLE " :: GOSUB 1130 :: CALL H
CHAR(20,20,32,12):: GOTO 520
540 IF TWO=0 THEN CALL HCHAR(20,
1,32,32):: GOSUB 620 :: GOTO 410
550 CTR(TWO,1)=0 :: DISPLAY AT(T
WO,4)SIZE(2):USING "###":CTR(TWO,
1)
560 IF SG$="+" THEN X=ONE+TWO ::
IF X>12 THEN DISPLAY AT(20,1): "
OHL" 12 BOXES!" :: GOSUB 620 ::
GOSUB 630 :: GOTO 410
570 IF SG$="-" THEN X=ABS(ONE-TW
O):: IF X>12 THEN GOSUB 620 :: G
OSUB 630 :: GOTO 410
580 IF BX(X)<>X THEN GOSUB 630 :
: GOSUB 620 :: DISPLAY AT(20,1):
"NOT POSSIBLE " :: CALL HCHAR(
20,1,32,32):: GOTO 410
590 BX(1)=0 :: CALL HCHAR(PR(1),
CC(1),32,2):: CALL HCHAR(19,1,32
,64)
600 GOTO 410
610 STOP
620 CTR(ONE,1)=CTR(ONE,2):: DISP
LAY AT(ONE,4)SIZE(2):USING "###":
ONE :: RETURN
630 CTR(TWO,1)=CTR(TWO,2):: DISP
LAY AT(TWO,4)SIZE(2):USING "###":

```

```

THE :: RETURN
640 REM END TURN /ALL USED
OR GIVE UP IN DESPAIR !
650 TOT=0
660 FOR X=1 TO 15 :: TOT=TOT+CTR
(X,1):: NEXT X
670 IF TOT>0 THEN 750 : SCORE
680 FOR X=1 TO 15 :: IF CTR(X,2)
=0 THEN CTR(X,1)+CTR(X,2)=CT(X,1
NT)+ND-2+1::
690 NEXT X
700 FOR X=1 TO 15 :: DISPLAY AT(
X,4)SIZE(2):USING "###":CTR(X,1):
: NEXT X :: TEST=0
710 FOR X=1 TO 15 :: TEST=CTR(X,
1)+TEST :: NEXT X
720 IF TEST=0 THEN 750 : PERFECT
SCORE
730 GOTO 380 : CONTINUE GAME PLAY
EP
740 STOP
750 TBX=0 : SCORE SECTION
760 FOR X=1 TO 12 :: TBX=TBX+B(
X):: NEXT X
770 SCORE(P)=SCORE(P)+TOT+TBX
780 DISPLAY AT(12+P,26):USING " #
## :STR$(TOT+TBX) :: TOT=-1
790 IF SCORE(1) 100 OR SCORE(2)
100 THEN 800 ELSE 280
800 IF P=2 THEN 820 ELSE 280
810 STOP !***
820 CALL CLEAR :: IF SCORE(1)>SC
ORE(2) THEN P=1 ELSE P=2
830 PRINT
840 PRINT P$P$ " SCORE "STR$(C
ORE(P))$ " LOSE!" :
850 P=P+1 :: IF P=3 THEN P=1
855 PRINT P$(P) " SCORE "STR$(C
ORE(P) " " WINS" : : :
860 PRINT "ANOTHER GAME? Y OR N"
:: INPUT AS :: IF AS="Y" THEN 8
80 ELSE IF AS>"N" THEN 860
870 STOP
880 SCORE(1)+SCORE(2)=0 :: FUN 1
080
890 STOP
900 REM INSTRUCTIONS HERE
910 REM PRINTER SCREEN
920 CALL CLEAR :: PRINT "POMPEII
" : "WOULD YOU LIKE THE 'LONG'
INSTRUCTIONS ON YOUR TV : COP
REEN,DP ON YOUR THERMAL PRINTER
?"
930 PRINT "ENTER TW OR TP":
940 ON ERROR 230 :: INPUT AS ::
IF AS "TP" AND AS<"TV" THEN 94
0
950 IF AS="TV" THEN 1040
960 REM AS="TP"-PRINTER-FIRST TE
ST!

```


**"We will be flying at a height of 30,000 feet.
Our air speed will be 500 knots.
And there's a fair chance we're going to crash."**





No smoking. Fasten your seat belt. You about to take off in a 747. But on this flight you're the pilot.

You could hardly describe THORN EMI's Jumbo Jet Pilot as simply another video game. It's more like a session in a flight simulator with life-like instrumentation and graphics.



Jumbo Jet Pilot 1988-1989 Computer
5 disk version, Performance rating
Customize, Thrust, Advance, Climb, Descent
Undercarriage, Wings, Weather, Fuel, Landing
Gear, Speed, Altitude, Horizon, Pitch, Roll, Yaw, Heading, Vertical
Speed, Way, Navigation, and 10-15
Thorn EMI logo

To cope you need to be alert. You should expect the unexpected. And you definitely shouldn't lower the undercarriage when your air speed is dropping and the horizon suddenly appears vertical!

On landing, your in-flight computer will assess your skills and give a performance rating. If you manage to land that is.

Jumbo Jet Pilot is one of 21 challenging new home computer games from THORN EMI. It's pretty demanding. But our programs aren't all work and no play.

River Rescue, Kickback and Soccer are all action games. Pool and Darts will suit armchair sportsmen.

And whilst budding Beethovens play the VIC Music Composer, would-be Chancellors can work on their budgets with Home Financial Management.



Darts



Jumbos Computer

We also have educational puzzles for children that will puzzle adults at higher skill levels. But there's one simple idea behind all our titles: we've designed them for players who are bored with run of the mill TV games.

Now is that Heathrow ahead?
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leading Computer software outlets

```

100 LET F=0
200 GOSUB 9050
300 LET H$="MINUTES"
400 RAND
500 LET PY=3
600 LET PX=15
700 LET A=1
800 LET P$=" 0 "
900 LET D=1
1000 LET D=0
1100 LET K=0
1200 LET A1=1
1300 LET A2=1
1400 LET A3=1
1500 LET A4=1
1600 LET T=240
1700 IF F=1 THEN GOTO 5670
1800 PRINT AT PY-1,PX,"
1900 PRINT AT PY+1,PX+9," "
2000 PRINT AT PY,PX:P$
2100 GOSUB (INT (RAND*10)+10)+600
2200
2300 LET T=T-1
2400 IF T=0 THEN GOTO 6595
2500 LET PY=PY
2600 LET PX1=PX
2700 IF INKEY$="5" THEN LET PX=P
2800
2900 IF INKEY$="6" THEN LET PY=P
3000
3100 IF INKEY$="7" THEN LET PY=P
3200
3300 IF INKEY$="8" THEN LET PX=P
3400
3500 LET G=3980+10*PY
3600 GOSUB G
3700 GOTO 3800
3800 IF PX<15 THEN LET PY=9
3900 IF PY<2 THEN LET PY=2
4000 IF PX=15 AND K=1 THEN GOTO
4100
4200 RETURN
4300 IF PX<=8 THEN LET PX=8
4400 IF PX>=22 THEN LET PX=22
4500 RETURN
4600 IF PX<=9 THEN LET PX=9
4700 IF PX>=21 THEN LET PX=21
4800 RETURN
4900 IF PX<=10 THEN LET PX=10
5000 IF PX>=20 THEN LET PX=20
5100 RETURN
5200 IF PX<=11 THEN LET PX=11
5300 IF PX>=19 THEN LET PX=19
5400 RETURN
5500 IF PX<=12 THEN LET PX=12
5600 IF PX>=18 THEN LET PX=18

```

Escape from the Pyramids of Mars

Mars hides many secrets beneath its silent shifting sands. Was there a highly intelligent ancient race which existed on the planet in times long past?

You are a member of a team attempting to solve that mystery. You were on the verge of a great breakthrough after a mysterious pyramid was uncovered by excavations in one of the many Martian deserts — miles from the nearest earth colony. Your mission was to explore this newly unearthed structure.

But on entering you found yourself trapped in the interior of the pyramid. To escape you discovered that you needed four keys from the tomb's inner chamber, but you can only carry one key at a time due to a strange force which surrounds them.

The corridors and key chamber are protected by defence mechanisms still operational after millions of years. And your air supply is running out...



RUNS ON A ZX81 IN 16K

BY DAVID HEALEY

```

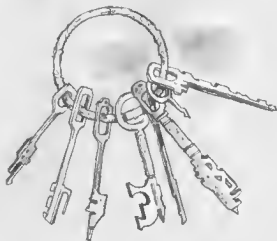
4054 RETURN
4060 IF PX<=13 THEN LET PX=13
4062 IF PX>=17 THEN LET PX=17
4064 RETURN
4070 IF PX<=14 THEN LET PX=14
4072 IF PX>=16 THEN LET PX=16
4074 RETURN
4080 IF PX<>15 THEN LET PX=15
4082 RETURN
4090 GOTO 4030
4100 GOTO 4080
4110 GOTO 4090
4115 GOTO 4030
4120 GOTO 4080
4130 GOTO 4030
4150 IF PY=17 AND PX<>15 THEN LE
T PY=PY+1
4151 IF PY=17 AND PX<>15 THEN LE
T PX=PX+1
4160 IF PY=18 THEN LET PY=18
4161 IF PY=18 AND PX<>15 THEN LE
T PY=18
4162 IF PX<2 THEN LET PX=2
4163 IF PX>20 THEN LET PX=20
4164 IF PX<=10 AND A1=1 AND K=0 TH
EN GOTO 4500
4185 IF PX=21 AND A2=1 AND K=0 T
HEN GOTO 4510
4186 IF PX=26 AND A3=1 AND K=0 T
HEN GOTO 4520
4188 IF PX=4 AND A4=1 AND K=0 TH
EN GOTO 4530
4189 IF INKEY$="S" OR INKEY$="7"
AND PX<>15 THEN RETURN
4200 RETURN
4500 LET A1=0
4505 GOTO 4500
4510 LET A2=0
4515 GOTO 4500
4520 LET A3=0
4525 GOTO 4500
4530 LET A4=0
4535 GOTO 4500
4590 LET K=1
4610 LET P$=" "
4620 RETURN
4700 LET D=D+1
4710 PRINT AT 0,16;D
4720 LET P$=" "
4730 IF D=4 THEN GOTO 7000
4735 LET K=0
4740 RETURN
6000 PRINT AT 11,13," " AT 11,1
3," "
6002 IF PY=11 THEN GOTO 6500
6003 RETURN
6010 PRINT AT 11,16," " AT 11,1
8," "
6012 IF PY=11 THEN GOTO 6500
6013 RETURN
6020 PRINT AT 13,13," " AT 13,1
3," "
6022 IF PY=13 THEN GOTO 6500
6023 RETURN
6030 PRINT AT 13,16," " AT 13,1
8," "
6032 IF PY=13 THEN GOTO 6500
6033 RETURN
6040 PRINT AT 15,13," " AT 15,1
3," "
6042 IF PY=15 THEN GOTO 6500
6043 RETURN
6050 PRINT AT 15,16," " AT 15,1
8," "
6052 IF PY=15 THEN GOTO 6500
6053 RETURN
6060 PRINT AT 15,5," " AT 15,5,"
" AT 15,5," " AT 15,5," "
6062 IF PX=4 THEN GOTO 6500
6063 RETURN
6070 PRINT AT 15,10," " AT 15,10,"
" AT 15,10," " AT 15,10," "
6072 IF PX=9 THEN GOTO 6500
6073 RETURN
6080 PRINT AT 15,22," " AT 15,22,"
" AT 15,22," " AT 15,22," "
6082 IF PX=21 THEN GOTO 6500
6083 RETURN
6090 PRINT AT 15,27," " AT 15,27,"
" AT 15,27," " AT 15,27," "

```

```

6092 IF PX=26 THEN GOTO 6500
6093 RETURN
6500 FOR L=1 TO 30
6505 PRINT AT PY,PX," ",AT PY,P
X," "
6508 NEXT L
6510 FOR L=1 TO 50
6520 NEXT L
6525 CLS
6530 PRINT "YOU HAVE BEEN ANNIHI
LATED BY THE"
6540 PRINT "PYRAHIDS SELF DEFENCE"
6545 PRINT "MECHANISM"
6550 PRINT "GOOD JOB ITS ONLY A
GAME"
6560 PRINT
6570 PRINT "PRESS N/L FOR ANOTHE
R GAME"
6575 IF INKEY$="" THEN GOTO 6575
6577 LET F=1
6578 CLS
6580 GOTO 220
6585 LET F=0
6590 GOTO 9785
6595 CLS
6600 PRINT "YOU HAVE SUFFOCATED
THROUGH"
6610 PRINT "LACK OF OXYGEN. HARD
LUCK"
6620 PRINT
6630 PRINT "PRESS N/L FOR ANOTHE
R GAME"
6640 IF INKEY$="" THEN GOTO 6640
6642 LET F=1
6644 CLS
6650 GOTO 220
6660 LET F=0
6670 GOTO 9765
7000 CLS
7005 PRINT AT 6,16," "
7010 PRINT AT 7,15," "
7015 PRINT AT 8,14," "
7020 PRINT AT 9,13," "
7025 PRINT AT 10,12," "
7030 PRINT AT 11,11," "
7035 PRINT AT 12,10," "
7040 PRINT AT 13,9," "
7045 PRINT AT 14,8," "
7050 PRINT AT 15,7," "
7055 PRINT AT 16,6," "
7060 PRINT AT 17,5," "
7065 PRINT AT 18,4," "
7070 PRINT AT 19,3," "
7075 PRINT AT 20,2," "
7080 PRINT AT 21,1," "
7085 PRINT AT 22,0," "
7090 PRINT AT 23,0," "
7095 PRINT AT 24,0," "
7100 PRINT AT 25,0," "
7105 PRINT AT 26,0," "
7110 PRINT AT 27,0," "
7115 PRINT AT 28,0," "
7120 PRINT AT 29,0," "
7125 PRINT AT 30,0," "
7130 PRINT AT 31,0," "
7135 PRINT AT 32,0," "
7140 PRINT AT 33,0," "
7145 PRINT AT 34,0," "
7150 FOR L=1 TO 10
7160 NEXT L
7300 PRINT AT 20,15," "

```



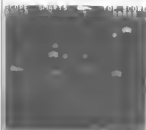


OMEGA MISSION £7

The first and only version of the classic 'Omega Mission' game. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene.

THE PROTECTOR £7

The game of the year! It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene.

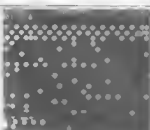


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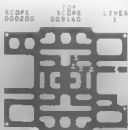


CENTIPEDE £6

The classic centipede game. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene.

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The classic puckman game. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene. It's a real time action game with a large, detailed space scene.



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```

7303 GOSUB 7400
7305 PRINT AT 20,15;"
7310 GOSUB 7400
7320 PRINT RT 19,15;"
7330 GOSUB 7400
7340 PRINT RT 19,15;"
7350 GOSUB 7400
7360 PRINT RT 18,15;"
7370 GOSUB 7400
7380 PRINT AT 18,15;"
7395 GOSUB 7400
7397 GOTO 7450
7400 FOR L=1 TO 7
7410 NEXT
7420 RETURN
7450 PRINT RT 20,17;"
7460 PRINT AT 19,17;"
7480 PRINT RT 18,17;"
7490 PRINT RT 1,0;" YOU ESCAPED T
HE PYRAMID WITH
7495 IF T=1 THEN LET H$="MINUTE"
7500 PRINT "T;" "H$;" OF OXYGEN
REMAINING."
7510 FOR L=1 TO 150
7520 NEXT L
7530 CLS
7540 PRINT "PRESS N/L FOR ANOTHE
R CRHE."
7550 IF INKEY$="" THEN GOTO 7550
7555 CLS
7560 GOTO 1
9050 PRINT "
9055 PRINT "
9060 PRINT "
9065 PRINT "
9070 PRINT "
9075 PRINT "
9080 PRINT "
9085 PRINT "
9090 PRINT "
9095 PRINT "
9100 PRINT "
9110 PRINT "
9120 PRINT "
9130 PRINT "
9140 PRINT "
9150 PRINT "
9160 PRINT "
9170 PRINT "
9180 PRINT "
9190 PRINT "
9200 PRINT "
9210 PRINT "
9220 FOR R=0 TO 20 STEP 4
9230 PRINT RT R,22;"SYNACROOP"
9240 NEXT R
9250 FOR S=1 TO 21 STEP 4
9260 PRINT RT B,22;"SOFTWARE"
9270 NEXT B
9280 FOR X=1 TO 150
9290 NEXT X
9300 FOR X=1 TO 22
9310 SCROLL
9320 NEXT X
9325 CLS
9330 PRINT "
9340 PRINT "
9350 PRINT "
9360 PRINT "
9370 PRINT "
9380 PRINT "
9390 PRINT "
9400 PRINT "
9410 PRINT "
9420 PRINT "
9430 PRINT "
9440 PRINT "
9450 PRINT "
9460 PRINT "
9470 PRINT "
9480 PRINT "
9490 PRINT "
9500 PRINT "

```



FROM THE

```

9510 PRINT "
9520 FOR U=1 TO 150
9530 NEXT U
9540 CLS
9550 PRINT "
9570 PRINT " YOU ARE R MEMBER
OF A MARTIRN"
9580 PRINT "EXPLORATION PRTRY AN
D HAVE"
9590 PRINT "EXCURTED SEVERLL PY
RRMID"
9600 PRINT "STRUCTURES ON THE SU
RFACE OF"
9605 PRINT "MRRS."
9610 PRINT " UPON ENTERING YOU
FIND
9620 PRINT "YOURSELF TRAPPED IN
THE STRANGE"
9630 PRINT "INTERIOR OF THE PYRR
MID, TO
9640 PRINT "ESCAPE YOU MUST COLL
ECT FROM
9650 PRINT "KEYS FROM THE INNER
CHAMBER."
9660 PRINT "CARRY THEM TO THE DO
OR RND"
9670 PRINT "PLRCE THEM IN THE SL
OT YOU CAN"
9680 PRINT "HOWEVER ONLY CARRY O
NE KEY AT R"
9690 PRINT "TIME."
9700 PRINT " THE CORRIDOR RND
KEYROB ARE"
9710 PRINT "PROTECTED BY R DEFEN
CE MECHANISM"
9720 PRINT "WHICH CAN KILL YOU I
F YOU ARE"
9730 PRINT "CLOSE WHEN IT IS OPE
RATING."
9740 PRINT " REMEMBER THRT YOU
R OXYGEN"
9750 PRINT "SUPPLY IS LIMITED, S
O HURRY"
9755 PRINT "PRESS N/L TO CONTINU
E"
9760 IF INKEY$="" THEN GOTO 9760
9765 CLS
9770 PRINT "
9780 PRINT "
9790 PRINT RT 2,0;"",AT 2
,20;"
9800 PRINT AT 3,0;"",AT
3,25;"
9810 PRINT RT 4,0;"",RT
4,24;"
9820 PRINT AT 5,0;"",R
T 5,23;"
9830 PRINT AT 6,0;"",
AT 6,22;"
9840 PRINT "
9850 PRINT "
9860 PRINT "
9865 PRINT "
9890 PRINT "
9900 PRINT "
9910 PRINT "
9920 PRINT "
9930 PRINT "
9940 PRINT "
9945 FOR V=17 TO 20
9950 PRINT RT V,0;"",AT V,31;"
9955 NEXT V
9960 PRINT RT 20,4;"
9965 PRINT "
9975 PRINT AT 19,5;"",AT 19,10;"
9980 PRINT AT 19,22;"",RT 19,27;"
9990 SAVE "ONLY B"
9999 GOTO 1

```

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TANKER

A life on the ocean wave can be dangerous. There's always someone lurking around ready to blast your tanker right out of the water!

The object of this game is to knock out as many enemy tankers as possible using your anti-tanker gun — making sure that the vital supplies your warring opponent needs just don't get through.

To give those tanker captains that sinking feeling use keys "Z" to move left, "X" for right and "M" to fire.

```

10
EM These lines contain a line
   Defined Graphics
20 REM
   1010, 1020, 1030, 1050,
   1120, 2010, and 9330

100 RANDOMIZE GO SUB 9000. RE
M USR chrs
110 GO SUB 9300 REM instr
120 GO SUB 8000. REM vars
130 GO SUB 8500. REM screen
140 FOR n=1 TO 3 FOR o=50 TO 2
0 STEP -5 BEEP .01,o: NEXT o: N
EXT n
150 REM Here we go!
1600 FOR s=1 TO 0
1010 PRINT AT B,0: PAPER 5, INK
0,"G": PAUSE 5: PRINT AT B,0: PA
PER 6, INK 0,"FG": PAUSE 5: PAIR
T AT 6,0, PAPER 6, INK 0,"EFG"
PAUSE 5
1020 FOR b=1 TO 29: BEEP .005,-1
5: PRINT AT B,b-1: PAPER 5, INK
0,"EFG"
1030 PRINT AT 21,pos1, PAPER 1,"
": AT 21,pos: INK 7: PAPER 1,"A
B": LET pos1=pos: LET 1=CODE INK
BY%: LET pos2=pos+1120 AND pos<
27)-1:132 AND pos13) IF NOT f
THEN IF 1=109 THEN LET f=1: LET
fp=pos: LET x/fp=20: BEEP .01,30
1040 IF NOT f THEN GO TO 1100
1050 PRINT AT x/fp+1,fp: PAPER 1,
": AND x/fp=20: AT x/fp,fp: INK
7,"CD": IF x/fp=20 THEN GO TO 2000
1060 LET x/fp=x/fp-1 GO TO 1110
1100 FOR n=1 TO 4: NEXT n
1110 NEXT b
1120 PRINT AT B,29, PAPER 6, INK
0,"EFG": PAUSE 5: PRINT AT B,30
: INK 0, PAPER 6,"E": PAUSE 5:
PRINT AT 8,31, PAPER 6,"": LET
asm+1 GO SUB B510
1140 FOR n=20 TO 40 STEP 10: BEE
P .1,n: NEXT n: NEXT a
1150 IF f THEN PRINT AT x/fp+1,fp
: PAPER 1
1160 FOR n=1 TO 100: NEXT n
1170 PRINT AT 12,11 INK 1:"GAME
OVER": INK 6: OVER 1 FOR 1110
TO 5 STEP 1: PUT 0: DRAU 2
5 TO 0: BEEP .005,x/2: NEXT x: OVE
R 0
1190 INK 2: PRINT AT 14,1, FLASH
1, PAPER 6,"PRESS ANY KEY FOR A
NOTHER GAME"
1200 IF INKEY="" THEN FOR n=30
TO 50: BEEP .005,n: NEXT n: GO T
O 1200
1210 RUN 120
1220 IF fp<0 OR fp>b+2 THEN LET
f=0
1230 PRINT AT 9,fp: PAPER 1,""
GO TO 1110
1240 PRINT AT x/fp,fp, PAPER 1,"
": FOR n=5 TO 10: FOR p=1 TO 5
: PRINT AT 5,b, PAPER 6, INK 2,"E
FG": BEEP .03,n*5: NEXT p: NEXT
n: FOR n=40 TO 50: PRINT AT 5,b,
PAPER 6, INK 2: OVER 1:"HHH": 6
EEP .01,n: PRINT AT 5,b, PAPER 6
OVER 1:"" BEEP .01,55-n: N
EXT n: PRINT AT 5,b, PAPER 6:""
: LET h=h+1, PAUSE 30: GO SUB
3510 LET f=0 GO TO 1140
0000 LET h=0, LET n=0
0010 LET pos=14, LET f=0 LET po
s1=pos
0020 LET n=INT (RND*15)+10
0400 RETURN
0500 BORDER 3: INK 7: PAPER 1, B
RIGHT 1: CLS: PRINT PAPER 3, FL
ASH 1,"TANKER", FLASH 0, BRI
GHT 0,"HITS", HISS55
FOR x=1 TO 8, PRINT PAPER 6,"": N
EXT x: PRINT AT 21,0, PAPER 3,"B
RIGHT 0, INK 1,"": AT 21,29,""
9510 PRINT AT 0,17, BRIGHT 0, PA
PER 3, INK 7,h, AT 0,20,"
0500 RETURN
9000 RESTORE 9100
9010 FOR x=0 TO 7
9020 FOR y=0 TO 7: READ z: POKE
USR (CHR$(97+x))+y,z: NEXT y
9030 NEXT x
9030 RETURN
9100 DATA BIN 00000011.BIN 00000
011.BIN 00000011.BIN 00000011.BI
N 00000111.BIN 00011111.BIN 0111
1111.255
9110 DATA BIN 11000000.BIN 11000
000.BIN 11000000.BIN 11000000.BI
N 11000000.BIN 11111000.BIN 1111
1110.255
9120 DATA 0.1.1.1.3.1.3.0
9130 DATA 0.BIN 10000000.BIN 100
00000.BIN 10000000.BIN 11000000
.BIN 10000000.BIN 11000000.0
9140 DATA 0.BIN 00000100.BIN 000
00100.BIN 00000110.BIN 00001111.
BIN 01111111.BIN 00111111.BIN 00
011111
9150 DATA 0.0.0.0.0.BIN 10101000.2
510.255.255
9160 DATA 0.0.0.0.0.BIN 11111110
.BIN 11111100.BIN 11111100
9170 DATA 0.0.0.BIN 10010010.BIN
01010100.0.BIN 01010100.BIN 100
10010
9300 PAPER 0: INK 7 BRIGHT 1 B
ORDER 0: CLS
9310 PRINT INVERSE 1,"TANKER
by Mike Levers © 1982"
9320 PRINT "The object of this
Simple Game" is to knock out
as many enemy tankers as possi
ble using your anti-tanker
(GROAN!) gun."
9330 PRINT "which looks like th
is: AB" "To move your gun US
e key "Z" for left and X for ri
ght to fire Press M"
9340 PRINT "FLASH 1," PAES
3 ANY KEY TO BEGIN "
9350 IF INKEY="" THEN INK INT
AND+4+1: OVER 1 FOR n=3 TO 15
: PRINT AT n,0, NEXT n: OVER 0
GO TO 9350
9360 BEEP 5.10 RETURN

```

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"Computerised scrumping! Whatever will they think of next? In my day we had to get out among the apple trees for a bit of fruity fun. And there was always the gamekeeper to keep an eye out for. If he caught you you'd know all about it! All these computerised chappies have to worry about is dropping apples!"

The game is set outside the tall ivy clad wall of an orchard. You are waiting at the bottom of the wall holding a basket on your head. Your computer "accomplice" will throw apples over the wall at random positions. All you have to do is catch as many as you can.

When you have caught 15 apples the game stops momentarily and the computer tells you it has found something to help you. A trestle is drawn on the screen and you hop up onto it. The game continues but you have less time to catch the falling apples.

The trestle drawing routine is continued each time you collect 15 apples in your basket, moving you progressively further up the screen, giving you less and less time to catch the falling fruit.

Once you have missed 10 apples the game stops and the computer tells you your score — a chance to have another crack at these apples!

Variables:

Y1: vertical position of basket.

Y: vertical position of man.

X1: horizontal position of basket and man.

APP: number of apples caught.

MISS: number of apples missed.

O: limit of fall of apples in FOR/NEXT loop.

Z: determines level change (increase by 15 each level).

X: random horizontal position of falling apples.

L: control flag (equals 1 or 10).

The 'I' character is a clear screen command (ESC, CTRL, CLEAR) and it appears in lines 10, 100, 2155.

Type line 2155 exactly as it is for correct screen format.

Lines 3050, 3070, 5100, 5130, 5140, 5160, 5340 should have the words between quotation marks typed in INVERSE video.

Also lines 5010-5070 should have the "s" typed in alternate INVERSE video. In line 5250 type 21 CONTROL M's (underlining).




```

1 REM OVER THE ORCHARD WALL BY PETER & M
ARK WRIGHT AUGUST 1982.
3 GOSUB 5000
4 Q=79:Z=15
7 GOSUB 1000:GOTO 10
8 GOSUB 1002
10 ? "WE'VE GOT "APP;" APPLES SO FAR"
15 IF APP>=15 THEN 750
20 POKE 704,52:POKE 705,218:COLOR 1:PLOT
0,15:DRAWTO 159,15
25 X=INT(RND(1)*120)+15:POKE 53278,0
29 REM MAIN PLAYING LOOP
30 FOR I=10 TO 0:B=STICK(0)
35 SOUND 0,1+1,10,0
40 COLOR 3:PLOT X,I:DRAWTO X+2,I:COLOR 0
:PLOT X,1-2:DRAWTO X+2,1-2
42 IF B=15 THEN POKE HPOS0,X1:POKE HPOS
P1,X1:GOTO 50
44 IF B=11 AND X1>=67 THEN X1=X1-2:POKE
HPOS0,X1:POKE HPOS1,X1:SOUND 1,0,1,8:G
OTO 50
46 IF B=7 AND X1<=177 THEN X1=X1+2:POKE
HPOS0,X1:POKE HPOS1,X1:SOUND 1,0,1,8:G
OTO 50
50 IF PEEK(53252)<0 THEN APP=APP+1:GOTO
600

```

```

0,60:DRAWTO 159,60
790 PLOT 20,60:DRAWTO 25,69:PLOT 20,60:D
RAWTO 15,69:PLOT 140,60:DRAWTO 145,69:PL
OT 140,60:DRAWTO 135,69
800 IF APP=30 THEN 20
810 COLOR 1:PLOT 0,51:DRAWTO 159,51:PLOT
0,50:DRAWTO 159,50
820 PLOT 20,50:DRAWTO 25,59:PLOT 20,50:D
RAWTO 15,59:PLOT 140,50:DRAWTO 145,59:PL
OT 140,50:DRAWTO 135,59
830 IF APP=45 THEN 20
840 COLOR 1:PLOT 0,41:DRAWTO 159,41:PLOT
0,40:DRAWTO 159,40
850 PLOT 20,40:DRAWTO 25,49:PLOT 20,40:D
RAWTO 15,49:PLOT 140,40:DRAWTO 145,49:PL
OT 140,40:DRAWTO 135,49
860 IF APP=60 THEN 20
870 COLOR 1:PLOT 0,31:DRAWTO 159,31:PLOT
0,30:DRAWTO 159,30
880 PLOT 20,30:DRAWTO 25,39:PLOT 20,30:D
RAWTO 15,39:PLOT 140,30:DRAWTO 145,39:PL
OT 140,30:DRAWTO 135,39
890 IF APP=75 THEN 20
900 GOTO 20
999 REM PLAYER/MISSILE GRAPHICS SET UP
1000 GRAPHICS 7:X1=125:Y=172:Y1=180

```

RUNS ON AN ATARI 400/800 IN 16K

over the orchard wall

BY PETER AND MARK WRIGHT

```

60 IF I=Q THEN MISS=MISS+1:IF MISS=10 TH
EN 3000
70 COLOR 1:IF I=Q THEN GOSUB 150
71 SOUND 1,0,0,0:NEXT 1
74 REM CHECKS FOR NEXT LEVELS
75 IF APP=15 AND L=0 THEN ? "HOLD ON A M
INUTE, I'VE FOUND A PLANK":SOUND 0,0,0,0
:L=1:GOTO 100
80 IF APP=2 THEN ? "HOLD ON A MINUTE, I'
VE FOUND ANOTHER":? "PLANK":SOUND 0,0,0,
0:GOTO 100
90 GOTO 25
100 FOR I=1 TO 2000:NEXT I:D=0-Q:Z=Z+15
:Y=Y-20:Y1=Y1-20: ? "":GOTO B
149 REM SOUND AND TEXT DRAWING INFORMATIO
N
150 FOR J=1 TO 5:SOUND 0,150,12,14:NEXT
J:FOR J=14 TO 0 STEP -1:SOUND 0,150,10,J
:NEXT J:RETURN
600 FOR N=1 TO I-2 STEP -1:COLOR 0:PLOT
X,N:DRAWTO X+2,N:NEXT N:I=83:POKE 53278,
0
605 FOR J=1 TO 5:SOUND 0,40,10,14:NEXT J
:FOR J=14 TO 0 STEP -1:SOUND 0,40,10,J:N
EXT J
610 POKE 656,0: ? "WE'VE GOT "APP;" SO F
AR, GREAT "IN IT""":GOTO 71
749 REM PLANK AND TRESTLE DRAWING ROUTIN
ES
750 COLOR 1:PLOT 0,71:DRAWTO 159,71:PLOT
0,70:DRAWTO 159,70
760 PLOT 20,70:DRAWTO 25,79:PLOT 20,70:D
RAWTO 15,79:PLOT 140,70:DRAWTO 145,79:PL
OT 140,70:DRAWTO 135,79
770 IF APP=15 THEN 20
780 COLOR 1:PLOT 0,61:DRAWTO 159,61:PLOT

```

```

1002 GRAPHICS 7+32:COLOR 1:SETCOLOR 2,12
,4:SETCOLOR 4,0,6:SETCOLOR 0,14,4:POKE 7
52,1:X1=125
1004 POKE 656,1:POKE 657,11: ? "HANG ON A
MINUTE!"
1005 POKE 704,6:POKE 705,6
1010 A=PEEK(106)-24:POKE 54279,A:PMBASE=
256+A
1020 POKE 559,62
1030 POKE 53277,3
1040 POKE HPOS0,X1:POKE HPOS1,X1
1050 FOR J=PMBASE+1024 TO PMBASE+1470:PO
KE J,0:NEXT J
1070 FOR J=PMBASE+1024+Y TO PMBASE+1032+
Y:READ A:POKE J,A:NEXT J
1080 DATA 255,255,255,255,126,126,126,12
6,60
1090 FOR I=PMBASE+1280+Y1 TO PMBASE+1290
+Y1:READ A:POKE I,A:NEXT I
1100 DATA 195,153,153,255,60,60,60,60,10
2,102,231
1110 POKE 623,1
1140 RESTORE
1999 REM PLAYFIELD SET UP
2000 SETCOLOR 1,9,8:COLOR 2:PLOT 159,13:
DRAWTO 159,0:DRAWTO 0,0
2010 POSITION 0,14:POKE 765,2:X10 10,6,
0,0,"S:"
2015 COLOR 3:PLOT 4,14:DRAWTO 17,14
2020 PLOT 5,13:DRAWTO 13,13:PLOT 6,12:DR
AWTO 14,12:PLOT 7,11:DRAWTO 11,11:PLOT 1
0,10:DRAWTO 12,10
2030 COLOR 2:PLOT 7,13:PLOT 10,12
2035 COLOR 3:PLOT 47,14:DRAWTO 78,14:PLO
T 49,13:DRAWTO 77,13
2040 PLOT 50,12:DRAWTO 75,12:PLOT 53,11:

```



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```

DRAWTO 74,11:PLOT 58,10:DRAWTO 72,10
2050 PLOT 60,9:DRAWTO 71,9:PLOT 63,8:DR
WTO 70,8:PLOT 64,7:DRAWTO 68,7:PLOT 65,6
:DRAWTO 68,6
2060 COLOR 2:PLOT 63,9:PLOT 70,9:PLOT 67
,6:PLOT 65,10:PLOT 72,11:PLOT 49,14:PLOT
49,14:PLOT 53,13:PLOT 59,13
2070 COLOR 3:PLOT 110,14:DRAWTO 125,14:P
LOT 112,13:DRAWTO 124,13:PLOT 115,12:ORA
WTO 123,12
2080 PLOT 118,11:DRAWTO 121,11:PLOT 119,
10:DRAWTO 121,10
2090 PLOT 140,14:DRAWTO 150,14:PLOT 141,
13:DRAWTO 148,13:PLOT 143,12:DRAWTO 148,
12:PLOT 146,11:DRAWTO 149,11
2100 PLOT 147,10:DRAWTO 150,10
2110 COLOR 2:PLOT 114,14:PLOT 123,14:PLOT
T 114,13:PLOT 120,13:PLOT 119,12:PLOT 12
1,11:PLOT 144,13:PLOT 148,12
2120 PLOT 146,11:PLOT 142,14:IF L=1 THEN
RETURN
2130 COLOR 3:FOR I=15 TO 79:T=INT(RND(1)
*15):PLOT 0,I:DRAWTO T,I:NEXT I
2140 COLOR 2:PLOT 4,34:PLOT 7,76:PLOT 4,
18:PLOT 6,25
2150 COLOR 3:FOR I=15 TO 80:T=INT(RND(1)
*20)+140:PLOT 159,11:DRAWTO T,11:NEXT 1
2155 ? "HERE WE ARE OUTSIDE THE ORCHARD
,IF YOU DROP 10 APPLES I'M NOT PLAYING."
2157 ? "PRESS RETURN WHEN YOU'RE READY":
INPUT A$
2160 RETURN
2999 REM END ROUTINE
3000 POKE 656,0:POKE 657,0: ? "

```

```

3180 FOR N=1 TO 50:NEXT N:SOUND 0,0,0,0:
NEXT 1
3190 SOUND 0,0,0,0:GOTO 3190
4999 REM OPENING TITLES AND INSTRUCTIONS
5000 GRAPHICS 17:OIM A$(1):HPOS0=53248:
HPOS1=53249
5005 ? #6: ? #6
5010 ? #6: "*****"
5020 ? #6: " "
5030 ? #6: " * over the * "
5040 ? #6: " * "
5050 ? #6: " * orchard wall * "
5060 ? #6: " * "
5070 ? #6: "*****"
5080 ? #6
5090 ? #6: " BY": ? #6
5100 ? #6: "PETER & MARK WRIGHT"
5110 ? #6: ? #6: ? #6: ? #6
5120 ? #6
5130 ? #6: " do you require"
5140 ? #6: " instructions ?"
5150 ? #6
5160 ? #6: " (y or n)"
5170 SETCOLOR 2,15,8:SETCOLOR 0,11,8
5180 FOR J=1 TO 50:NEXT J
5190 SETCOLOR 0,15,8:SETCOLOR 2,11,8
5200 FOR J=1 TO 50:NEXT J
5210 IF PEEK(764)=43 THEN 5240
5220 IF PEEK(764)=35 THEN POKE 764,255:R
ETURN
5230 GOTO 5170
5240 POKE 764,255:GRAPHICS 0:SETCOLOR 2,
13,2:SETCOLOR 4,14,4
5250 ? : ? " OVER THE ORCHARD WALL": ? "<21
CTRL M>"
5260 ? "Young Albert Atari has managed t
o ": ? "Climb the ivy clad orchard wall,
and"
5270 ? "has disappeared inside.": ? ? "
He will throw the apples over the"
5280 ? "wall. You must try and catch as
many": ? "as you can in the basket that A
lbert"
5290 ? "has provided.": ? : ? "(You can mo
ve left or right by using": ? "a joystick
in the left hand socket)"
5300 ? : ? " Every time you catch 15 ap
ples,": ? "Young Albert will try and make
it"
5310 ? "easier for you?????": ? : ? " S
ee how many apples you can catch"
5320 ? "before Albert gets annoyed at th
e": ? "number of apples you miss,"
5330 ? : ? "PRESS RETURN TO START GAME
": INPUT A$
5340 RETURN

```



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As this is a very long program for the unexpanded Vic-20 with extra memory the first job is to type in some extra instructions.

When the insert coin sign shows press "I" then "1" to run. "I" shows your profit and losses. Now and again your Vic will present you with the chance to "gamble or collect" which could double or treble your winnings.

Any one or two rests can be "HELD" by pressing the corresponding number on the keyboard — "1, 2 or 3". In lines 800-855 certain graphic characters appear. These are merely shifted letters which will appear as upper case letters when the program is run.

Line 845 graphics are for the word "UP", line 847 for "DOWN" and line 849 for "BROKE EVEN". The two strange characters in lines 800 and 875 are a reversed "N" and a reversed "I". These are used to change the computer from upper to lower case and vice versa; they can be obtained by the following method.

Type the program line as shown but leave a space where this character is to appear and press return. Using the cursor control keys, position the cursor in the space you have left, press CTRL and RVS ON at the same time. Now press the key is "N". In line 875 it is "SHIFTED N". Now press return and continue with the program. The symbol in line 104 is achieved by pressing the key (in quotes). Line 170 is "I" in quotes, the listing was done on a Pat printer which does not have the "E" sign, so when you come to a "I" (in quotes) just press the "E" key

```

1 02$="#####":H$=CHR$(13):C3$="#####":LCH$=H$+H$+C2$+R$=3687$
2 50=$R-2:O1MS=F:15:10=RND(.1):CC$="#####":POKE$R-1,15:GOTO10
3 55/R)="#":GOTO145
4 55/R)="#":GOTO145
5 55/R)="#":GOTO145
6 55/R)="#":GOTO145
7 55/R)="#":GOTO145
8 55/R)="#":GOTO145
9 55/R)="#":GOTO145
20 RN=1:GOSUB125
21 POKE$R-13:PRINT"FRUIT MACHINE."
22 PRINT"##### 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20"
23 FMS="#####":PRINTFMS
24 PRINT"#####":PRINTFMS
25 PRINT"#####":PRINTFMS
26 PRINT"#####":PRINTFMS
27 PRINT"#####":PRINTFMS
28 PRINT"#####":PRINTFMS
29 PRINT"#####":PRINTFMS
30 IF$1:THENPRINT"INSERT COIN."
31 IF$1:THENPRINT"REEL F1"
32 PRINT"#####":PRINTFMS
33 PRINT"#####":PRINTFMS
34 PRINT"#####":PRINTFMS
35 PRINT"#####":PRINTFMS
36 PRINT"#####":PRINTFMS
37 PRINT"#####":PRINTFMS
38 PRINT"#####":PRINTFMS
39 PRINT"#####":PRINTFMS
40 PRINT"#####":PRINTFMS
41 PRINT"#####":PRINTFMS
42 PRINT"#####":PRINTFMS
43 PRINT"#####":PRINTFMS
44 PRINT"#####":PRINTFMS
45 PRINT"#####":PRINTFMS
46 PRINT"#####":PRINTFMS
47 PRINT"#####":PRINTFMS
48 PRINT"#####":PRINTFMS
49 PRINT"#####":PRINTFMS
50 IF$1:THEN15
100 PUE190.0
102 GET$;IFE$="":THEN102
104 IFE$="1":THEN300
106 IFE$="2":THEN100
108 IN=IN+1:IS=1
115 PRINT"#####":PRINTFMS
125 FOR$=1TO15
140 ONIN:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
145 IFRL$=N:RETURN
150 NEXT
155 IFRL$=N:RETURN
160 P=0:IF$=1:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
165 IF$=2:THENPRINTFMS
170 GET$;IFE$="":THEN102
175 IF$=3:THEN102
176 IF$=4:THEN102
177 IF$=5:THEN102
178 IF$=6:THEN102
179 POKE$R-20:FOR$=1TO20:NEXT:POKE$R-3:IF$=1:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2165
2170 GOTO170
2175 PRINT"#####":PRINTFMS
2180 CN=INT(RND(.1)+20)+8
2185 PRINT"#####":PRINTFMS
2190 FOR$=1TOCN
2195 FOR$=0TO10:STEP5
2200 IF$1:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2205 IF$2:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2210 IF$3:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2215 IF$4:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2220 IF$5:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2225 IF$6:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2230 IF$7:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2235 IF$8:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2240 IF$9:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2245 IF$10:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2250 IF$11:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2255 IF$12:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2260 IF$13:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2265 IF$14:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2270 IF$15:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2275 IF$16:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2280 IF$17:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2285 IF$18:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2290 IF$19:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2295 IF$20:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2300 IF$21:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2305 IF$22:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2310 IF$23:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2315 IF$24:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2320 IF$25:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2325 IF$26:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2330 IF$27:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2335 IF$28:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2340 IF$29:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2345 IF$30:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2350 IF$31:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2355 IF$32:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2360 IF$33:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2365 IF$34:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2370 IF$35:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2375 IF$36:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2380 IF$37:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2385 IF$38:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2390 IF$39:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2395 IF$40:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2400 IF$41:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2405 IF$42:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2410 IF$43:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2415 IF$44:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2420 IF$45:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2425 IF$46:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2430 IF$47:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2435 IF$48:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2440 IF$49:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2445 IF$50:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2450 IF$51:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2455 IF$52:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2460 IF$53:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2465 IF$54:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2470 IF$55:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2475 IF$56:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2480 IF$57:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2485 IF$58:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2490 IF$59:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2495 IF$60:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2500 IF$61:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5,6,7,8,6,3,4,5
2505 IF$62:RND(.1):GOTO3,4,5,6,7,8,9,3,4,5
```

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machine code

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(machine code)



INVADERS

(machine code)



RUNGALDIDS (machine code)

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Fleets of swooping and diving alien craft

SNAKEBITE (machine code)

Eat the snake before it eats you. Variable speed (very fast at top speed)

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A ZX81 version of the well known game

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K Razy Antics	ROM	8K	27/50
K Razy Antics	ROM	8K	27/50
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RUNS ON A DRAGON

IN 32K

BY A. CHAPMAN

MISSILE

THE cities of planet Tanth are peaceful places with some of the most beautiful buildings in any city of the Sol system.

But that peace will soon be shattered and the graceful sky towers will soon be burning — unless you can halt the deadly rain of missiles heading toward the planet from the depths of space where a hostile power is lurking...

This game for the new Dragon is an adaptation of the video favourite. It's got all the features of the arcade game and should test even the best Missile Commanders.

Line the oncoming missiles up in the sights of your anti-missile laser and blast away. Don't let any get through to destroy your planet's cities.

Use keys 1, 2 and 3 to fire and keys U-up, H-left, J-right, N-down to move your laser-sight.

Variables

CIS(N): contains information for drawing bases and cities

HI: high score.

A(N),B(N): x,y co-ordinates of missiles.

C(N): whether city destroyed (1) or built (0).

A,B,A1,B1: position of laser-sight.

M(N): number of missiles in base N.

M1(N): x co-ordinates of top of bases.

B\$,C\$: movement.

S: score

NI: number of missiles.

R: radius of explosion.

```

10 REM*****MISSILE COMMAND*****
20 REM*****A BY*****
30 REM*****A. CHAPMAN*****
50 DIM C(81)
55 HI=0
60 DIM AC(8) B(20) C(4) M(3) M1(3)
65 R=5:NI=1
70 S=0
100 FOR NI=1 TO 250 STEP 10: SOUND N1: NEXT N
110 C(1)=0 C(2)=0 C(3)=0 C(4)=0
120 Y=0:FOR NI=1 TO 4:IF C(N)=1 THEN K=K+1:NEXT N
130 IF K=4 THEN 700
140 FOR NI=1 TO 250 STEP 10: SOUND N1: NEXT N
150 A(1)=127:B(1)=1 A(127)=91 A(1)=3 AC(2)=0 AC(3)=3
160 M1(1)=46:M1(2)=127:M1(3)=212
170 FOR NI=1 TO NI:B(N)=1:NI=NI+1:NI=250:1:NEXT N
180 *****UP SCREEN*****
190 LINE(0,100)-(255,192),PSET,0F
200 C=0:U
210 C(1)=0:AC(2)=100:E10:F10 L(1)=0:AC(4)
220 E10:F10 L(1)=0:AC(4)=0:AC(2)=0
230 C(1)=0:AC(4)=0:AC(2)=0:AC(3)=0:AC(4)=0
240 FOR NI=1 TO 7
250 IF C(N)=1 THEN 260
260 DRAW C(N)
270 NEXT N
280 FOR NI=1 TO NI:IF AC(N)=1 THEN 310
290 PSET AC(N),B(N):310:AC(N)=0:NI=NI+1
300 IF AC(N)=0 THEN 320
310 IF AC(N)=255 THEN AC(N)=255
320 B=1:KEY$

```



COMMAND



```

330 IF B=J OR B=N OR B=U OR B=N THEN 350
340 B=J
350 B=U
360 IF B=N THEN A=5 IF B>255 THEN A=255
370 IF B=N THEN A=5 IF A=0 THEN A=0
380 PSET(A,B,1)
390 A=1
400 SOUND 150 1
410 IF B=U THEN S=5 IF B<10 THEN S=10
420 FOR N=1 TO 10 IF A=1 OR A=2 OR A=3 THEN 500
430 IF B=N>170 THEN 490
440 GOTO 370 THEN A=1
450 NEXT N GOTO 640
460 UNVLC(A) IF A=1 THEN 490
470 SOUND 200 5
480 A=1
490 LINE(A,170)-(A,0) PSET(CIRCLE(A,0),A,2)
500 FOR N=1 TO 10 IF A=1 THEN 500

```

```

500 PPOINT(A,N,B,N) IF A=2 THEN S=10 A=1
510 NEXT N CIRCLE(A,B) R 1 LINE(M(U),170)-(A,B) PSET(CIRCLE(A,B),A,2)
520 IF A=N>350 AND A=N>54 THEN A=1 DRAW(C,1) B=1,180,UB,R20,DB A=1 RETU
530 IF A=N>50 AND A=N>112 THEN C(2)=1 DRAW(C,1) B=1,180,UB,R20,DB A=1 RETU
540 IF A=N>116 AND A=N>141 THEN C(3)=1 DRAW(C,1) B=1,180,UB,R20,DB A=1 RETU
550 IF A=N>143 AND A=N>167 THEN C(4)=1 DRAW(C,1) B=1,180,UB,R20,DB A=1 RETU
560 IF A=N>174 AND A=N>198 THEN C(5)=1 DRAW(C,1) B=1,180,UB,R20,DB A=1 RETU
570 IF A=N>199 AND A=N>223 THEN C(6)=1 DRAW(C,1) B=1,180,UB,R20,DB A=1 RETU
580 CLS 1
590 PRINT "YOU HAVE ACHIEVED THE HIGH SCORE."
600 GOTO 300

```

```

610 H=0
620 FOR N=1 TO 10
630 IF A=N>1 THEN H=H+1
640 NEXT N
650 IF H<10 THEN 200
660 PCLS "YOU'VE GOT 'EM ALL"
670 X=0
680 FOR N=1 TO 10 IF C(N)=1 THEN S=100 NEXT N
690 FOR N=1 TO 3 IF A=N>1 THEN S=250 NEXT N
700 CLS 1
710 PRINT "YOU HAVE ACHIEVED THE HIGH SCORE."
720 GOTO 300

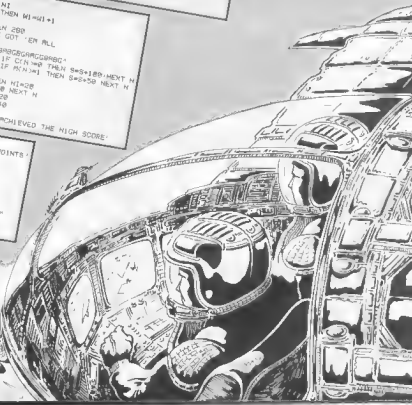
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```

730 H=0
740 PRINT "PRINT PRINT OF N1" POINTS
750 CLS 1
760 FOR N=1 TO 2000 NEXT N
770 PRINT "YOUR SCORE IS " S
780 PRINT "THE HIGH SCORE IS " H
790 PRINT "PRESS A KEY FOR A GAME OF"
800 PRINT "MISSILE COMMAND"
810 IF INKEY="" THEN 800 ELSE 80

```

Illustration: Doran Cross



101MMK10;V0(10),D0(10).
T(11),R(2),P(-1)
2P.#21
3E

4 PR1ST#80,PTS
5 R90JRWFF3
6LDM10
7 RRZCPT,X,BEGR1
8DEX,8PLR2,8MIRR
9RTS

101
11P.#6
12#T# ZXCASDQWE"
155#8000
16N=1
17GDS.1
18#IN,"HOW MANY TREES
(1-200),0:1F0200,0=200
19P.#12;7#E1=0

20F.J=100
30X=A.R.%400+32
35IFS7X=255,G,30
40S7X=255
50N.
60S160=#40404040
70S192=#40004040
80S124=#40404040
90S146=#40404040
100S140=#40404040
110S140=#40404040
111X=488
120F.I=1010;V0(1)
#0,D0(1)=0,MMK1)=0,N.
1210=0
140F.I=1TON
142R=A.R.%447+32
144IFS7X=255,G,142
146V0(1)=R,N,I

560S7X=32;S7Y=10,R=Y
565V0(1)=R
570N.I
580G.150
1000R=A%32,V=0/32
1030R=A,(U-E)B=A,(V-G)C=A#A#8#8
1040IFC(Z/2)=G,Y=0
1050R.
1500S(X-2)=#0010817
1510F.J=0T05000,N.
1520P.#12
1530P."PRESS A KEY TO GO AGAIN",L1.#FF3
1550G.#
2000P.#12,"YOU RESIGN!"
2010P."PRESS ANY KEY TO GO AGAIN",L1.#FF3;G.#
3000IFS7(X+31)=255,R.
3010IFS7(X+32)=00R/32=15,R.

147IFN=1,P."THERE IS 1 RHINO";G,149
148P."THERE ARE ",N," RHINOS"
149P.#30;F.J=0T05000,N.
150P."you",#120,"90
152L1.RP0
154P." "#30
155W=7#00
160GDS.(2000+M1000)
250S7X=15
252IFS7X=94,G,15000
3000=0
305P.I=1TON
310IFS7X=1;G,325
315R=V0(1)
317I=RX32;V=R/32 E=X/32;G=X/32
320IFU(X);IFV(X),G,IFA.(U-E)X(R,(V-G);G,325
321K=32#00N(G-V)#00N(E-U)
322F.J=R TO X,S,K
323IFS7X=255;J=X,N,J,G,325
324N,J;D0(1)=1;0;S7R=10
325H.I
330IFS7X=0;G,150
350F.I=1TON
355IFD0(1)=0,G,570
360P=V0(1)
365MMK1)=S7(R+31)
370MMK2)=S7(R+32)
375MMK3)=S7(R+33)
380MMK4)=S7(R+1)
385MMK5)=S7(R+1)
390MMK6)=S7(R+33)
395MMK7)=S7(R-33)
400MMK8)=S7(R-32)
405MMK9)=S7(R-31)
410IFS7X(4)=255;IFS7X(8)=255;MMK7)=255
415IFS7X(8)=255;IFS7X(6)=255;MMK9)=255
420IFS7X(6)=255;IFS7X(2)=255;MMK3)=255
425IFS7X(2)=255;IFS7X(4)=255;MMK1)=255
425K=R;Y=R
430U=RX32;V=R/32;E=X/32;G=X/32
435A=R.(U-E);B=A,(V-G);Z=A#A#8#8
439L=0
440F.J=32T0-320.-32
450F.M=1T01
455L=L+1
460IFMM1=2550RMM1=1360RMM1=10;G,N
470D=R+J#M,IFA.(0/32-R/32)
=310R0(320R0/511);G,N
480IFMM1=15;M=1;J=-32,I=N,N,N,N,N,G,W
490GDS.F
500N,N,N.

"#30

3020S7X=32;X=X+31
3030R.
4000IFS7(X+32)=255 R.
4010IFS7(32)=15,R.
4020S7X=32;Y=Y+32
4030R.
5000IFS7(X+33)=255,R.
5010IFS7(32)=310R/32=15,R.
5020S7X=32;X=X+33
5030R.
6000IFS7(X-1)=255;R.
6010IFS7(32)=0,R.
6020S7X=32;X=X-1
6030R.
7000R.

8000IFS7(X+1)=255;R.
8010IFS7(32)=31;R.
8020S7X=32;X=X+1
8030R.
9000IFS7(X-33)=255;R.
9010IFS7(32)=00R/32=1;R.
9020S7X=32;X=X-33
9030R.
10000IFS7(X-32)=255;R.
10010IFS7(32)=1;R.
10020S7X=32;X=X-32
10030R.
11000IFS7(X-31)=255;R.
11010IFS7(32)=310R/32=1;R.
11020S7X=32;X=X-31
11030R.

15000P.#12."PHEW,MADE IT!"
15010P."PRESS A KEY TO GO AGAIN",L1.#FF3
15030N=N+1;IFN>10,N=10
15040G.#5
16000P.#12"YOU0 ARE STRANDED IN RHINO"
16020P."COUNTRY.YOUR ONLY HOPE IS TO"
16030P."REACH THE SANCTUARY OF A HUT0"
16040P."SITUATED IN A CLEARING ON THE"
16050P."FAR SIDE OF THE TREES(#223)."
16060P."ONCE YOU ARE IN A DIRECT LINE"
16070P."WITH A HIDDEN RHINO (EITHER"
16080P."HORIZONTAL,VERTICAL OR DIAGONAL)"
16090P."AND PROVIDING THERE ARE NO"
16100P."INTERVENING TREES,IT WILL APPEAR"
16110P."AND PROCEED TO CHASE YOU,"
16120P."FORTUNATELY,THE RHINOS CAN MOVE"
16130P."NO FASTER THAN YOU AND,BEING"
16140P."BULKY,ARE UNABLE TO FOLLOW YOU"
16150P."DIAGONALLY BETWEEN TREES."
16160P."press"#12B" a"#120"key";L1.#FF3
16170P.#12"TO MAKE YOUR MOVE,USE THE KEYS"
16180P."AROUND THE 'S',YOU CAN RESIGN"
16190P."FROM A CHASE AT ANY TIME BY"
16200P."PRESSING THE SPACEBAR,NO OTHER"
16210P."KEYS ARE RECOGNISED,"
16220P." SHOULD YOU SUCCEED IN REACHING"
16230P."SAFETY,THE NUMBER OF RHINOS"
16240P."WILL BE INCREASED BY ONE,UP TO A"
16250P."MAXIMUM OF TEN,YOU MAY CHOOSE"
16260P."THE NUMBER OF TREES YOU WANT,"
16270P."THE MORE YOU HAVE,THE EASIER THE"
16280P."GAME."
16290R.



RHINO

RUNS ON AN ATOM IN 12K

BY R. M. ANDREWS

"Ont here in the bush us big game hunters have to live by our wits and our trusty elephant guns. Things can get really nasty — and more often than not — they do! Did I ever tell you about the time I was trepped out in the open in Rhino country? That was a tough one I can tell you. Dozens of the brutes came running at me as I made a

beeline for that old poachers hut down in the clearing. Luckily I managed to keep dodging through the trees and none of them got me. But, by jove, it was close!"

Now you can relive our hunter's exciting adventure. You are stranded in the bush and your only hope is to reach the sanctuary of a but situated in a

clearing on the far side of some trees. Once you are in a direct line with a hidden rhino, and providing there are no intervening trees the horned beast will appear and proceed to chase you.

Fortunately for you the rhinos cannot run any faster than you and being big and bulky are unable to follow you diagonally through the

trees. Should you succeed in reaching the but unmolested the number of rhinos will be increased by one — up to a maximum of 10. You may choose the number of trees you want. The more there are the easier the game.

Full instructions on how to deal with a runaway Rhino are included in the program.

Illustration: Terry Rogers

Sinclair ZX Spectrum

**16K or 48K RAM...
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key keyboard...
colour and sound...
high-resolution
graphics...**

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First, there was the world-beating Sinclair ZX80. The first personal computer for under £100.

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Now there's the ZX Spectrum! With up to 48K of RAM. A full-size moving-key keyboard. Vivid colour and sound. High-resolution graphics. And a low price that's unrivalled.

Professional power— personal computer price!

The ZX Spectrum incorporates all the proven features of the ZX81. But its new 16K BASICROM dramatically increases your computing power.

You have access to a range of 8 colours for foreground, background and border, together with a sound generator and high-resolution graphics.

You have the facility to support separate data files.

You have a choice of storage capacities (governed by the amount of RAM). 16K of RAM (which you can upgrade later to 48K of RAM) or a massive 48K of RAM.

Yet the price of the Spectrum 16K is an amazing £125! Even the popular 48K version costs only £175!

You may decide to begin with the 16K version. If so, you can still return it later for an upgrade. The cost? Around £60.

Ready to use today, easy to expand tomorrow

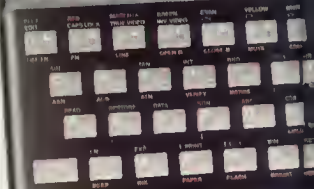
Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer—available now—is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232 / network interface board.



ZX Spectrum



Key features of the Sinclair ZX Spectrum

- Full colour—8 colours each for foreground, background and border, plus flashing and brightness-intensity control
- Sound—BEEP command with variable pitch and duration.
- Massive RAM—16K or 48K.
- Full-size moving-key keyboard—all keys at normal typewriter pitch, with repeat facility on each key.
- High-resolution—256 dots horizontally x 192 vertically, each individually addressable for true high-resolution graphics.
- ASCII character set—with upper- and lower-case characters.
- Teletext-compatible—user software can generate 40 characters per line or other settings.
- High speed LOAD & SAVE—16K in 100 seconds via cassette, with VERIFY & MERGE for programs and separate data files.
- Sinclair 16K extended BASIC—incorporating unique 'one-touch' keyword entry, syntax check, and report codes.

rum



The ZX Printer—available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set—including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (85ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.



The ZX Microdrive—coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K bytes using a single interchangeable storage medium.

The transfer rate is 16K bytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.



ZX Spectrum software on cassettes—available now

The Spectrum software library is growing every day. Subjects include games, education, and business/household management. Flight Simulation... Chess Planetoids... History... Inventions VJ-CALC... VJ-3D Club Record Controller... there is something for everyone. And they all make full use of the Spectrum's colour, sound, and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

How to order your ZX Spectrum

BY PHONE—Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day. BY FREEPOST—use the no-stamp needed coupon below. You can pay by cheque, postal order, Barclaycard,

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KRAZY KONG

BY TIMOTHY BOONE

RUNS ON A PET IN 8K

Kong. Now there's a name to conjour with. And that's just what we've done. At least one of our readers has, and has come up with a version of the famous arcade game. Tim says his game is a very close copy of the arcade game's fourth screen — the most difficult and popular.

If you have not played the arcade version before then you'll need an introduction to our gorilla friend. The basic idea is that Kong has captured the beautiful heroine and taken her to the top of the Empire State Building.

Then Jump-Man — so called because of his amazing jumping prowess — comes to the rescue. Jump-Man has to rush to the top of the building and save the girl from the gruesome gorilla.

This game takes part in the attic section of the building. Jump-Man has to knock out the roof supports and send Kong crashing to his doom. There are eight supports and Jump-Man can knock them out by walking — or jumping — over them.

But there is a catch. These supports are each guarded by four moving fireballs — which also burn away the top and bottom rungs of Jump-Man's ladders. If you knock out all the plugs you'll get a bonus.

You start out with three lives and can lose these in many ways — as you'll find out. If you manage to conquer Kong the program loops and you get another chance to challenge him.

Tim says his game is a very close copy of the arcade game's fourth screen — the better?

J = position of Jump-Man; SC = Score including the bonuses (D).
LE = level, increased by one every time Kong is beaten.
C = number of plugs gone. If C = 8 then Peg goes into the fall routine.

MI - 8 = sound variables, B1-4 = positioning of fireballs.

B6-8 = the random element of the fireballs, A = peek (151) (to increase speed).

Program structure (shown by REMS):
98-350 = fireballs; 300-490 = various screen checking routines.
491-500 = sound.
500-690 = jumping routines.





```

10 JH=3 7C=0 LE=1
20 K=41 F=40 M=39 U=102 U=111 S=42 U=L
25 M1=59467 M2=59466 M3=59464 N=250
30 GOSUB4008
35 B1=32897 B2=33119 B3=32297 B4=33510
40 U=102 C=0
45 D=5800 J=3366
50 GOSUB2008
55 GOTC800
60 REM**FIREBALLS**
100 B5=INT(RND(0)*1) B6=INT(RND(0)*2)
110 B7=INT(RND(0)*1) B8=INT(RND(0)*1)
120 IF B5>1 THEN B5=-1
130 IF B6>1 THEN B6=-1
140 IF B7>1 THEN B7=-1
150 IF B8>1 THEN B8=-1
160 B1=B1+B5 B2=B2+B6 B3=B3+B7 B4=B4+B8
170 POKEB1-B5,L POKEB1+B5,S B1=B1+20
180 IF PEEK(B1+P)=L THEN POKEB1+P,L B1=B1+20
190 POKEB2-B6,L POKEB2+B6,S B2=B2+20
200 IF PEEK(B2+P)=L THEN POKEB2+P,L B2=B2+20
210 POKEB3-B7,L POKEB3+B7,S B3=B3+20
220 IF PEEK(B3+P)=L THEN POKEB3+P,L B3=B3+20
230 POKEB4-B8,L POKEB4+B8,S B4=B4+20
240 IF PEEK(B4+P)=L THEN POKEB4+P,L B4=B4+20
250 RETURN
260 REM**WALKING FLUG CHEL**
310 IF PEEK(J+K)=L THEN POKEJ+K,L GOSUB309 C=C+1
320 GOSUB350
330 RETURN
340 RETURN
350 IF PEEK(J+H)=L THEN POKEJ+H,L GOSUB346 C=C+1
360 GOSUB380
370 RETURN
380 IF C>7 THEN I=500
390 RETURN
392 REM**CLIMB SOUND**
394 POKEH7,16 POKEH8,37 POKEH7,0 RETURN
396 POKEH7,16 POKEH8,15 POKEH7,0 RETURN
400 REM** LADDER CHECKS**
410 IF PEEK(J-K)=L THEN POKEJ-K,L
420 IF PEEK(J-B)=L THEN POKEJ-B,L
430 RETURN
440 REM**LADDER CHECKS**
450 IF PEEK(J+B)=L THEN POKEJ+B,L
460 RETURN
470 IF PEEK(J-H)=L THEN POKEJ+H,L
480 IF PEEK(J-79)=L THEN POKEJ-79,L
490 RETURN
491 REM**JUMP SOUND**
492 POKEH1,16 POKEH2,37
493 FOR I=1 TO 3
494 FOR J=1 TO 200 STEP 15
495 POKEH3,H-T
496 NEXT I
497 NEXT J
498 POKEH1,0
499 RETURN
500 REM**JUMP**
510 J=J-H POKEJ+H,L POKEJ,M J=J+1 POKEJ-1,L GOSUB410 POKEJ,M

```

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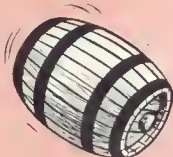
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ZX81

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```

1440 GETT$
1450 IFT$="" THEN RUN
1460 IFT$="N" THEN PRINT "N" END
1461 GOTO 1440
1470 SC=SC+D GOTO 60
1500 REM**AFTERS FALL**
1510 PRINT "M" FOR F=1 TO 23
1520 PRINT "*****"
1530 PRINT "XXXXXXXXXXXXXXXXXXXX"
1540 FOR G=1 TO 4
1550 PRINT "*****"
1560 NEXT G
1570 PRINT "-----KONG (RIP)"
1580 REM**CRASH SOUND**
1590 POKEM1.15 FOR B=1 TO 255 POKEM2.8 NEXT B POKEM3.0
1600 PRINT "XXXXXXXXXXXXXXXXXXXXXXXXXXXX YOU WIN!!"
1610 GOSUB 1700
1620 PRINT "XXXXXXXXXXXXXXXXXXXX YOU HAVE"
1632 GOSUB 1700
1623 RS="*****"
1625 PRINT "S CONQUERED KONG."
1630 GOSUB 1700
1640 PRINT "S ISN'T TRUE LOVE"
1642 GOSUB 1700
1644 PRINT "S WONDERFUL?"
1646 GOSUB 1700 PRINT "XXXXXXXXXXXXXXXXXXXX SHOW TRY AGAIN..."
1655 SC=SC+D LE=LE+1
1660 FOR F=1 TO 2000 NEXT
1670 GOTO 60
1700 FOR F=1 TO 2000 NEXT
1710 RETURN
2000 REM**KONG PICTURE**
2020 PRINT "P"
2060 PRINT "XXXXXXXXXXXXXXXXXXXX HIGH CAN YOU TRY?"
2066 PRINT "XXXXXXXXXXXX"
2070 FOR V=1 TO 50
2090 PRINT "
2100 PRINT "
2110 PRINT "
2120 PRINT "
2125 PRINT "
2130 PRINT "
2140 PRINT "
2150 PRINT "
2160 PRINT "
2170 PRINT "
2180 PRINT "
2190 PRINT "
2220 NEXT V
2222 FOR P=1 TO 2000 NEXT P
2230 RETURN
4000 PRINT "XXXXXXXXXXXXXXXXXXXX RAZZY KONG"
4010 PRINT "M BY TIM BOONE, SOUTHAMPTON"
4020 PRINT "M THE BASIC 1000 YOU ARE ON THE FOURTH"
4030 PRINT "M SCREEN OF THE ARCADE GAME, THAT IS, YOU"
4040 PRINT "M ARE IN THE ATTIC, KNOCK OUT THE PLUGS"
4050 PRINT "M NOW WALKING OR JUMPING OVER THEM."
4060 PRINT "M WHEN YOU HAVE KNOCKED OUT ALL THE PLUGS"
4070 PRINT "M WATCH WHAT HAPPENS!"
4080 PRINT "M P.S. MAKE SURE THE FIREBALLS DON'T COME"
4090 PRINT "M TOO CLOSE!"
4100 PRINT "M PRESS (SPACE)"
4110 GETT$ IFT$="" THEN 4110
4120 PRINT "M KEYBOARD COMMANDS "
4130 PRINT "M 8=UP"
4140 PRINT "M 2=DOWN"
4150 PRINT "M 4=LEFT"
4160 PRINT "M 6=RIGHT"
4170 PRINT "M <=JUMP LEFT"
4180 PRINT "M >=JUMP RIGHT"
4190 PRINT "M YOU SCORE 100 FOR EACH PLUG REMOVED"
4200 PRINT "M AND WIN THE BONUS IF YOU CONQUER KONG."
4210 PRINT "M PRESS (SPACE) TO PLAY..."
4220 GETT$ IFT$="" THEN 4220
4230 RETURN

```



MACHINE CODE

ARITHMETIC AND THE EIGHT-BIT . . .

Eight-bit microprocessors have a very limited range of arithmetic instructions, providing only addition and subtraction — and, in the 6809, an eight-bit by eight-bit multiplication.

Unless you are writing mathematical programs you will rarely need more than simple addition and subtraction.

Before we look at the assembly language instructions for addition and subtraction we need to look at the way arithmetic is performed on binary numbers.

An addition with decimal numbers, say $26 + 47$, is carried out digit by digit: $6 + 7 = 13$, which is 3 and carry 1; $1 (the\ carry) + 2 + 4 = 7$, so the answer is 73.

We do binary addition in the same way, so the sum $26 + 47$ in binary is $00011010 + 00101111$, and we calculate the answer as follows:

Bit 0:	$0+1=1$
Bit 1:	$1+1=0$, carry 1
Bit 2:	$1(carry) + 0+1=0$, carry 1
Bit 3:	$1(carry) + 1+1=1$, carry 1
Bit 4:	$1(carry) + 1+0=0$, carry 1
Bit 5:	$1(carry) + 0+1=0$, carry 1
Bit 6:	$1(carry) + 0+0=0$
Bit 7:	$0+0=0$

The bits are numbered in the usual fashion, with bit 0 being the rightmost (least significant) bit and bit 7 being the leftmost bit.

Thus we find the answer is 01001001 , which is, of course, equal to 73 decimal.

An eight-bit binary number can represent a decimal number from 0 to 255, but the sum of two numbers, each less than 255, may be more than 255.

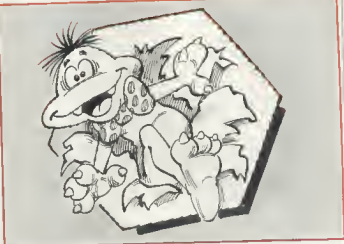
If we take an example, say $190 + 77$, or $10111110 + 01001101$ in binary, and work through the addition we find that the eight-bit answer is 00001011 .

However, in this case we have a carry of 1 from bit 7, and we really need nine-bits for the correct answer 100001011 , equal to 267 decimal.

If this addition is performed on an eight-bit microprocessor only eight-bits can be retained in the answer but the ninth bit will be stored in the Carry Flag in the Flags register, so after the addition $00011010 + 00101111$ the carry flag would be 0, while after the addition $10111110 + 01001101$ the carry flag would be 1.

The carry flag can be used in further processing.

We can now look at the assembly language instructions for performing addition.



FLYING THE FLAG WITH THE 6502

The opcode mnemonic for the addition instruction on the 6502 is ADC (ADD with Carry), which adds an eight-bit operand, the contents of the accumulator, and the carry flag, leaving the eight-bit result in the accumulator and the carry in the carry flag.

The carry flag is always included in an addition, and we have two instructions to alter the carry flag: CLC (Clear Carry) makes the carry flag 0 and SEC (Set Carry) makes the carry flag 1.

To perform the eight-bit addition from the first example above we could write:

```
LDA #26; Get first number into accumulator  
CLC; Make carry flag zero  
ADC #47; Add second number to A, leaving result in A
```

We can use other addressing modes with the ADC instruction, including absolute addressing which we looked at last month, and other addressing modes we have not covered yet.

The registers in the 6502 hold eight-bits only and to add numbers larger than 255 (more than eight-bits), we have to break the addition down into eight-bit sections.

For an example of a 16-bit addition, using absolute addressing, suppose we have two 16-bit numbers, the first in memory locations 1000 & 1001 hex, the second in memory locations 1002 & 1003 hex, and we want the answer in memory locations 1004 & 1005 hex (the numbers would be stored with the low eight bits

in the first of the two memory locations).

To get the 16-bit answer we first add the low eight-bits of the two numbers and then add the high eight-bits and the carry from the low eight-bits:

```
LDA $1000; Low byte of 1st number into accumulator  
CLC; Make carry flag 0  
ADC $1002; Add low byte of 2nd number  
STA $1004; Store low byte of answer  
LDA $1001; High byte of 2nd number into accumulator  
ADC $1003; Add carry and high byte of 2nd number  
STA $1005; Store high byte of answer.
```

HELPING THE 6809 ADD THINGS UP

For eight-bit addition we have the opcode mnemonics ADDA and ADCA which use accumulator A, and ADDB and ADCB which use accumulator B. ADDA and ADCB add the eight-bit number specified in the operand to the appropriate accumulator, leaving the answer in that accumulator.

ADCA and ADCB add the operand, accumulator and carry flag, leaving the result in the accumulator. All these instructions leave the carry from the addition in the carry flag.

To perform the addition in the first example above we can write:

```
LDA #26; Get first number into accumulator  
ADDA #47; Add second number, leaving answer in A.
```

As in the 6502 we can use other addressing modes with these addition instructions.

BY TED BALL

We also have the opcode mnemonic **ADD** for 16-bit addition; this operates on the accumulator D which you will remember from last month is really another name for the two eight-bit accumulators A and B together.

Thus, to add two 16-bit numbers, the first stored in memory locations 1000 and 1001 hex, the second stored in memory locations 1002 and 1003 hex, with the answer being stored in memory locations 1004 and 1005 hex (the numbers being stored with the high byte first), we would write
LDD \$1000; Get first number into D
ADD \$1002; Add 2nd number, leaving answer in D
STD \$1004; Store answer in memory

There is no add with carry instruction for accumulator D.

Addition of numbers with more than 16-bits can be performed by breaking down the numbers into eight or 16-bit sections and adding a section at a time, using an **ADD** instruction for the low eight or 16-bits and an **ADC** instruction for subsequent eight-bit sections.

ADDRESSING YOUR Z80 CORRECTLY

For eight-bit additions we have the opcode mnemonics **ADD** and **ADC**, each of which can be used in three addressing modes.

The **ADD** instructions add the operand to the accumulator A, leaving the result in A, and the **ADC** instructions add the carry flag and the operand to the accumulator, leaving the result in the accumulator.

The instructions are **ADD A, data**; **ADD A, data**; **ADD A, reg**; **ADC A, reg**; **ADD A, (HL)**; **ADC A, (HL)**.

In the first pair the operand is included in the instruction; in the second pair the operand is the contents of one of the registers A, B, C, D, E, H, L, and in the third pair the operand is the contents of the memory location whose address is in the register pair HL.

The addition from our first example above can be performed in several ways:

LD A,26; Get first number into accumulator

ADD A,47; Add second number, leaving answer in A

or
LD A,26; Get first number into A
LD B,47; Get second number into B
ADD A,B; Add B to A leaving answer in A etc.

We also have the 16-bit addition instructions **ADD HL,BC**; **ADC HL,BC**; **ADD HL,DE**; **ADC HL,DE**; **ADD HL,HL**; **ADC HL,HL**, which add, or add with carry, a register pair to the register pair HL, leaving the answer in HL.

To add two 16-bit numbers, the first stored in memory locations 1000 hex and 1001 hex, and the second stored in memory locations 1002 hex and 1003 hex, with the answer going into memory locations 1004 and 1005 hex (the numbers being stored with the low byte first), we can write:

LD HL,(1000H); First number into HL
LD BC,(1002H); Second number into BC
ADD HL,BC; Add BC to HL leaving answer in HL
LD (1004H),HL; Store answer in memory.

To add numbers of more than 16 bits we must break up the addition into eight or 16-bit sections and perform the addition one section at a time, using an **ADD** instruction for the low eight or 16-bits and an **ADC** instruction for subsequent eight or 16-bit sections.

PAY YOUR MICRO A COMPLEMENT . . .

So far we have regarded all binary numbers as being positive, eight-bit numbers representing a decimal number from 0 to 255 and 16-bit numbers representing a decimal number from 0 to 65535.

There are several ways of representing negative numbers in binary, but the commonest, and the most useful with microprocessors is **two's complement notation**.

To get the two's complement of a binary number we change the 0s to 1s and the 1s to 0s and add 1 to the result.

For example, to find the two's complement of 10110111 we first change 0s to 1s and 1s to 0s, giving 01001000, then add 1, giving 01001001.

If we add an eight-bit number to its two's complement we always find that the answer is 00000000, with a carry of 1, so the two's complement can be regarded as the negative of the number. Thus we have:

-1 = two's complement of 00000001 = 11111111

-2 = two's complement of 00000010 = 11111110

The easiest way of performing a binary subtraction by hand is to add the two's complement, so, for example 1-2 becomes 1 + (-2), or 00000001 + 11111110 which gives an eight-bit answer of 11111111. This is the number we get when we work out the two's complement form of -1.

In two's complement notation an eight-bit binary number represents a number between -128 decimal (10000000 binary) and +127 decimal (01111111 binary). Note that in the two's complement notation the high order bit of a negative number is 1 and the high order of a positive number is 0.

The subtraction instructions in the eight-bit microprocessors treat binary numbers as having the two's complement form, so, for example 10 - 5 would give the binary result 00000101 and 5 - 10 would give the binary result 11111011.

In the addition of binary numbers we that when the binary numbers were regarded as representing positive numbers in the range 0 to 255 the result of an addition could be more than 255, in which case the answer was a number less than 256 but the carry flag was set to 1 by the addition.

We have a similar situation with addition and subtraction of two's complement binary numbers.

If the result of the decimal calculation with numbers in the range -128 to +127 comes outside that range the eight-bit answer produced by the processor must of course be treated as a number between -128 and +127, but the **Overflow Flag** (called V in the 6802 and 6809, and C or P/O in the Z80) is set to 1.

The assembly language instructions for subtraction are similar to the addition instructions, with **SUB** instead of **ADD** and **SBC** instead of **ADC**, but there are differences between the three processors in the way the carry is handled in the **SBC** instructions.

The 6809 and Z80 have eight and 16-bit **SUB** and **SBC** instructions which can be used in exactly the same way as the **ADD** and **ADC** instructions. The 6802, however, has only **SBC** instructions, and we need to look at this separately.

The **SBC** instruction performs the calculation
Accumulator - operand - complement of carry

so if the carry is 0 we get accumulator - operand - 1, and if the carry is 1 we get accumulator - operand - 0.

Thus, to perform a straightforward eight-bit subtraction we must set the carry flag to 1 before performing the subtraction. To subtract 5 from 10 we need to write:

LDA 10; Get 1st number into accumulator

SEC; Set carry to 1

SBC 5; Get answer in accumulator

We can perform 16-bit (or more) subtraction in a similar way to addition. With subtraction instead of addition our previous example becomes:

LDA \$1000; Low byte of 1st number into accumulator

SEC; Make carry flag 1

SBC \$1002; Subtract low byte of 2nd number

STA \$1004; Store low byte of answer

LDA \$1001; High byte of 1st number into accumulator

SBC \$1003; Subtract high byte of 2nd number and carry

STA \$1005; Store high byte of answer.



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Graphics



BETWEEN THE LINES...

The effect of hidden line removal is shown in the two accompanying illustrations of rockets. One has hidden lines removed and one does not. I hope you will agree that the drawing of the rocket with the hidden lines removed (Fig 2) appears much more solid and realistic than the other.

The methods used for removing hidden lines are quite complex and highly mathematical, but for certain special cases they can be made comparatively simple.

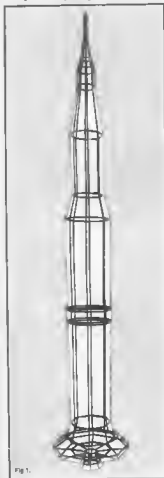


Fig 1.

A technique that helps in producing realistic images of solid objects is the removal of hidden lines from drawings of the object.

When describing a solid object, all the lines that are needed to represent its edges must be given because it may be necessary to view it from any angle.

A view of it from a specific viewpoint can be generated by using the perspective transformation. However, if the transformation is applied indiscriminately to all the lines of the object, what will be seen is a *wire-frame* representation of the object with the lines that ought to be obscured from view because they are at the back of the object displayed just as prominently as those at the front which actually are visible.

Although the *wire-frame* type of image does give a good idea of the shape of the object, it does not always convey the impression of solidity that one might want to achieve. Besides this, it sometimes gives an image that is ambiguous to the sense that they rankle visual sense in more than one way.

These problems can all be overcome if the lines that would be hidden from the viewer are removed.

The first point to make is that what conceals the part of an object that is hidden from view is a surface in front of it. The surface itself is surrounded by edges, all of which will be lines.

So the way to find out which are hidden from view is to determine which surfaces are masked from the observer by others, and then not to draw the lines representing the edges of hidden surfaces.

For this reason, a solid object needs to be described not simply in terms of the lines that give its edges, but also in terms of its surface facets. The lines outlining each surface facet must however be given.

To give an example, when dealing with a cube all its six surfaces would need to be given (those at the front, back, left, right, top and bottom). Each would be described by the four lines that surround the square surface facets.

One fairly simple way to remove the hidden lines is to draw each surface as a filled-in area starting from the back (that is, with the

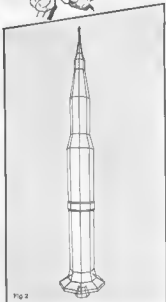


Fig 2

surfaces furthest from the observer), and working forwards.

In this way plotting the nearer surfaces will automatically cause them to overlay the ones that are further away, thus removing the parts that ought to be obscured.

A second method starts by plotting the points on the object nearest to the observer. It proceeds by examining the points that are further away, but along each line of sight from the observer to the object a region of visibility is maintained by continually updating the upper and lower horizons between which visibility is blocked by the parts already drawn.

Naturally the points that are found to be masked from view are not drawn, thereby removing the hidden parts. Only lines outside the masked region are drawn.

The only place that I have seen a comparatively simple program based on the last method and written in Basic is in *Practical programs for the BBC Computer and Acorn Atom* by David Johnson-Davies (Sigma Technical Press, 1982).

This gives a program for drawing surfaces with hidden line removal. For purposes of comparison, a program for drawing the surface without removing the hidden parts is also given there.

BY GARRY MARSHALL

Adventure

HOW TO FIND YOUR WAY...

The deeper you get into writing your Adventure game the more difficult it will become to find your way around the program lines as it continues to expand.

This will be especially true if you have no printer and must catch the lines as they scroll up the screen. Another difficulty is that you may eventually need to renumber the lines to squeeze in a previously unforeseen bit of logic. Then even the line numbers that you remembered will be lost!

Of course, a line printer will make life easier, but is not essential. Having written three Adventures without one, I have developed some guidelines to make life easier.

The first rule is to number lines in increments of no less than 10. This will leave plenty of gaps for insertions, reducing the likelihood of having to renumber.

Line numbers must be planned in advance, and the whole program sprinkled liberally with remarks. Back in the May issue I summarised how blocks of code might be laid out, and figure 1 shows a suggested range of line numbers for each block.

You can see that the bulk of the program is contained in Block 5 where the routines for each verb reside. Let us look in more detail at this block, as it contains the least distinguishable code in the program.

Start the routine for each verb on an increment of 1000, and then in 10's for each verb. Since each verb

BLOCK	LINE RANGE	PURPOSE
1	100-150	CLEAR string space DEFINE variable types DIMENSION arrays
2	200-250	READ DATA
3	300-450	Assign variables Check special conditions Clear screen PRINT display Await INPUT
4	500-600	Interpret INPUT
5	1000-30000	Execute plot (Verb routines)
6	40000 +	Set standard replies
7	50000 +	DATA statements

Figure 1. Line number range of each coding block

routine will be accessed by an ON K1 GOTO statement (K1 being the decode number for the verb) it is useful to precede each of these with a REM.

But wait! One of your last tasks on completion of the program will be to remove the REMs for three reasons: to save memory, speed execution, and to remove clues for would-be cheats! If the REMs are written on the lines pointed to by the ON K1 GOTO line numbers, undefined line errors will be the order of the day when they're deleted.

So place them on the line immediately preceding the start of each routine. Thus REMs for Block 5 would appear on lines 999, 1999, 2999 etc.

When they're gone, the running of the program will not be affected. As a bonus, deleting them will be easier, since they will be recognised as having numbers ending with a 9.

Figure 2 shows some typical code using REMs. Note that they are surrounded by asterisks - much easier to spot when scrolling!

As a change from software, I bring you the lowdown on a book - *The Captain #0 Book of Basic Adventures*. This American publication is by Robert Liddell, and set me back just under £12.

The opening chapters explain to the newcomer what Adventure is and how to play it. Further chapters advise would-be programmers how to write Adventure (plotting rather than programming the game), and how to market it when written. There is also an Adventure generator which I hope to come back to at a later date.

However, the bulk of the book contains the listing of no fewer than 18 Basic Adventures, including the works of well-known authors like Scott Adams, Greg Hesselet and Lance Micklus.

At this point I must make it quite clear that the listings are all in Level II Basic, a fairly standard Microsoft Basic used by TRS-80 Models I and III, and the Video Genie. A foreword to the book written by Scott Adams explains most of its peculiarities.

Each listing is preceded by some notes on the program, and all but one look readily convertible to other Basics, being free from PEEKs and POKEs. Anyone with 16k of memory, a good knowledge of their own machine's Basic, and an awareness that the TRS-80 screen has 64 x 16 characters should be able to use most of these listings. All are printed in exceptionally clear plain type rather than a photocopy of printer output, and although this made me apprehensive, I keyed in *Revenge of Walrog* by Don and Frede Boner and the only errors I came across were self-inflicted!

I can recommend it to serious Adventurers - but if you don't have a TRS-80 compatible machine, do browse it before purchasing.

It is published by 88 Northwest Publishing Inc., USA. I bought my copy from Gemel of Brighton but imagine that other dealers could obtain a copy.

```
599 REM ***** GOTO DECODED VERB ROUTINES *****
600 ON K1 GOTO 1000, 2000, 3000 . . . ETC
```

```
999 REM ***** TAKE *****
1000 IF IN > 6 THEN Q1$ = "TM CARRYING TOO MUCH" : GOTO 100
1010 IF P(K2) = 50 THEN Q1$ = "ALREADY GOT IT" : GOTO 100
1020 IF P(K2) <> LN THEN Q1$ = "DON'T SEE IT HERE" : GOTO 100
1030 IF C(K2) < 2 THEN Q1$ = "I CANT -YET" : GOTO 100
1040 P(K2) = 50 : IN = IN + 1 : Q1$ = "OK" : GOTO 100
1999 REM ***** DROP *****
2000 IF P(K2) <> 50 THEN Q1$ = "NOT CARRYING IT" : GOTO 100
    etc. etc. . .
```

Figure 2. Typical code showing numbering of REMs

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PLANET PATROL

Spectravision's Planet Patrol is an all action scrolling space game for the Atan VCS.

Imaginative graphics and considerable playability are sure to make this game tough competition for Atan's own Defender.

The idea of the game is to rescue a pilot whose ship is drifting helplessly in space.

But at the same time you're planet is being attacked by the TIAs (troublesome invading aliens) which you have to shoot down to score points.

When you have shot down the first wave of enemy ships and dodged their missiles you will be able to attack the enemy bases. But be careful to dodge the debris from the exploding missile bases as you will need to get past this to land at the space station in order to refuel for the night patrol. As you fly on the sky gets gradually darker and finally black.

The game now gets really tough as the screen is only lit by the moon and the occasional explosion of alien craft as your lasers blast deep into the night.

Also new from the Spectravision stable this month is a pretty and compulsive grub gobbling game called Tapeworm.

You guide an ever lengthening snake around the screen eating up the pieces of food that flesh up as you go.

It gets ever more difficult to control the snake and you can eat your own tail if you are not careful. Just to make things a little more difficult there are also two villains to be dealt with.

Nexas is a deep space 3D shoot out. Though not quite in the Activision Stermaster class it is none the less impressive.

Made in Hong Kong and imported from Amnesia there are six games in all in the brand new Spectravision range.

The other titles are Gangster Alley — a sort of shooting arcade where the heads of venous villains pop up for you to shoot at, Cross Force — another space



game, and China Syndrome a tough race against time to stop a nuclear reactor exploding, based on the recent movie of the same name.

The games are available in this country in compatible PAL form from Pancom of Gimsby at £24.95.

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If you are fed up of looking out high prices for the latest video game cartridge then this is your chance to win the entire range of Atan compatible games.

The offer comes from the Video Games Club — a new mail order firm which offers a money-back guarantee to club members if they find they can purchase cartridges cheaper elsewhere.

To enter the competition you have to join the club. This costs £25 for life or £7.50 for one year's trial membership.

New members will also receive two free puzzles worth over £8.

The first 1,000 members will then have their membership numbers led into a computer and the lucky winner will be randomly selected.

WELCOME TO THE THIRD GENERATION

COLECOVISION

If you got an Atan VCS or Mairtel Intellivision games machine for Christmas you may well be lacking yourself, or your dad, when you hear about the exciting new ColecoVision video games system.

The ColecoVision is one of the "Third Generation" of video games machines.

The video games boom was sparked off by the early bat and ball type games which were often given away free with new TV sets.

The next big breakthrough came with programmable video games such as the Atan VCS on which you could play an infinite number of games by simply purchasing a plug-in cartridge of your choice.

The so-called "Third Generation" machines — of which the ColecoVision is the first, are an upgrading and refinement of the second generation machines.

The ColecoVision has a massive 32K of Rom and 17K of Ram nestled under its black exterior. This makes it several times more powerful than all the video games machines currently on sale and also more powerful than most of the popular microcomputers as well.

Converted to gamers' language this means snappy detail, more moving characters than were previously possible, and greatly enhanced sound and colour.

The new machine will go on sale in the UK in the late Spring and early Summer with an impressive range of well known arcade titles. Prominent among these are Zaxxon, Donkey Kong, Gorf and Turbo.

Donkey Kong is practically identical to the Nintendo original and only the three hours play for twenty-five merchants will be able to notice any difference.

Zaxxon is 90% as good as the arcade game which, for a "state of the art" 3D game is pretty good. Gorf too is very close to its arcade counterpart.

The fourth big game from the

arcades to go with the new machine is the driving game Turbo. This requires a plug-in dash board with steering wheel and a foot pedal accelerator which connects to it. The gears are changed with one of the hand controllers which also attaches to the dash.

Taking big names straight from the arcades will be deliberate policy to support the ColecoVision when the machine goes on sale. Through its parent company CBS and Ideal Toys, ColecoVision has first option on buying arcade games from some of the big American and Japanese arcade game designers.

Perhaps the most important of these add-ons is a converter which enables all existing games for the Atan VCS to be played on the new system.

The next important add on will be a computer keyboard which will turn the ColecoVision into a home computer — a pretty powerful one too as it will access 32K of Ram for user programs.

TOP SELLERS

Mattel Intellivision and Atan VCS games again dominate our top 10 video games best sellers for the month of November.

Intellivision titles come in first, third, seventh, ninth and 10th places. Dungeons and Dragons holds onto its first place spot as pre-Christmas best seller.

1. Dungeons and Dragons (Mattell); 2. Defender (Atari); 3. B1 Bomber (Mattell); 4. Pacman (Atari); 5. Empire Strikes Back (Parker Brothers); 6. Star Raiders (Atari); 7. Lock 'n' Chase (Mattell); 8. Frogger (Parker Brothers); 9. Night Stalker (Mattell); 10. Sub Hunt (Mattell).



SUPERHERO MEETS THE SUPERBADDIE!

SPIDERMAN

Parker Video games will soon be providing some excitement at your local video games shop with personae appearances from Spiderman and Star Wars villain Darth Vader to promote their new games for the Atari VCS.

They will also be launching the Parker Video Games Club with offers of high score T-shirts, posters and cartridge holders, plus the latest information on new releases and when and where the super-heroes will be appearing in person.

There will be plenty to think about on the new games front too with Amidar and Spiderman rocketing towards the C&VG top ten Atari VCS chart.

Spiderman is challenged to a life or death race. He has to climb a sky-scraper and stop the Green Goblin exploding his super-bomb and devastating the city.

Spiderman climbs the building by shooting out his web and then wrenching himself up. You control the action using the joystick.

Pull the joystick down and Spiderman's web stretches enabling him to swing and kick down Green Goblin's henchmen who appear at the windows. You must be careful not to let the web swing across one of the Goblin's men. They will cut it — sending our hero crashing down to the ground.

The key to success in Spiderman is to use the web accurately and sparingly. You only have a certain amount of web strength which is displayed on the screen and which can also be supplemented by defusing the Goblin's bombs.

Also new from Parker Brothers this month is a version of the arcade game Amidar. This is a crazy-race to paint in the screen with blue boxes.

You are randomly an ape and a paint roller and are pursued by pigs and tribesmen. Quick reactions and a systematic approach are the keys to success in Amidar.



Parker Brothers have fifteen new Atari games planned for 1983, with Intellivision and Philips versions promised for next July.

Next out will be a second Star Wars title called Jedi Arena and another game straight from the archives Super Cobra, the all action helicopter shoot-out, needs no introduction to Arcadestars.

Parker Video games are available from most good Atari stockists at £29.95.

ANYONE LOST AN ARK?

RAIDERS

Ever wished you were Indiana Jones, the swashbuckling hero of Raiders of the Lost Ark? Then this is your chance to share some of the action as you join the search for the fabled Lost Ark of the Covenant.

In this new game for the Atari VCS you must find the Ark which is hidden in the Valley of Poison, located somewhere outside the Egyptian city of Cairo.

The game follows the adventure format. You move Indy around the screen searching for clues, collecting treasure, and articles such as a whip, a pistol, and flute, which you will need to overcome specific challenges during the game.

The first scene puts you down in a market place where you have to collect the equipment

you will need for your journey.

The first thing to buy is a flute which protects you from the snakes, spiders, and tsetse-flies that pursue you later in the game.

You will also need a grenade to break your way into one of the rooms where more clues are hidden.

The whip and the pistol enable you to kill some of the adversaries you encounter and also let you blast the walls of the dungeons should you unfortunately find your self incarcerated during the game.

You are only allowed six pieces of equipment at a time. These are all shown at the bottom of the screen and you select the one you want to use by moving the indicator dot to below the appropriate piece.

As with most adventure games you have to explore a number of rooms containing various challenges. In Raiders they are based on the film.

Once you have found your way into the enormous maze field you can begin the search for the Valley of Poison where you will find the ark.

The game is played with both joysticks. The right joystick moves Indy around the screen, cracks his whip, fires his pistol and explodes his grenade.

The left joystick moves the indicator dot enabling you to select items of equipment.

The game will be in the shops this month retailing at £29.95.

MORE DREAMS FROM THE AMERICANS

INTELLIVISION

Intellivision owners, jealous of the wider choice of games available for the Atari VCS, will have plenty to smile about in 1983.

The big three independent American games makers have now launched cartridges for the Mattel machine.

Prize-winning Demon Attack which was the top selling video-game in America in 1982 is now available for the Intellivision.

Also new from Imagic is an undersea battle game called Atlantis, a Donkey Kong-type game called Beauty and the Beast and a game of truly breathtaking graphics entitled Micro-Surgeon.

This last is based on the science-fiction film Fantastic Voyage in which a submarine was reduced millions of times in size and injected into the body of a top scientist.

In Micro-Surgeon you are that submarine, seeking 'out and repairing damaged organs.

The talented Activision team have also turned their skills into original games for the Mattel machine. Pitfall — the jungle adventure in which our hero swings across crocodile infested swamps, seeks treasure, and is chased by scorpions and other nasties can now be enjoyed on your Intellivision.

The second Activision game is Stampede. This transforms you into a cowboy on horseback, armed with a lasso with which you must round up the stray cattle.

Coleco have also joined the rush to produce software for Intellivision with versions of their top hottest titles — Donkey Kong, Golf, Zaxxon and Turbo.

Add to the above all Mattel's own releases and the recent announcement from Parker Brothers that their titles will be available in Mattel format by next July.

It will add up to much more choice for Intellivision owners in the New Year.

THE SEVENTH

HELPING US TO HELP YOU

The Seventh Empire is a unique game and it is bound to cause some unique problems. We feel that we have done everything we can at our end to combat these problems but we will need a lot of help from the players.

Time is going to be critical as we must process the orders in time to work on the galactic map for the following issue.

To help with this we will need to be able to easily identify Seventh Empire orders in our post and single them out for processing. Please write "Seventh Empire Orders" on the envelope.

We will need to be able to read your orders clearly, so work them out in rough before filling in the coupon in C&VS, that way your order sheet will not be plagued by crossings out. And try to write clearly and neatly in block capitals, so that we cannot misunderstand your orders.

Always fill in your own code number as this is a double check

A Colour Genie home computer is the prize awaiting our top-scoring Seventh Empire commander.

If you can guide your space tribe to the top profits for this opening game fun of Seventh Empire, you will have earned your reward.

And any supreme space commander would be pleased to map out future galactic campaigns on such a fine piece of modern technology.

Lowie Electronics is hoping the Colour Genie will take over from its popular predecessor.

on order authenticity. You will find your seven fleets starting positions and your code number on the printout sheet with your rule book. If it is missing, or if the sheet contains the wrong name and address, please ring and let us know.

Remember which of your fleets is where. Fleet 1 will be fleet 1 throughout the game and if you have jumbled your fleets the computer will not accept the moves as legal.

The order form will appear each month (see opposite) with a clear scissors mark and cut-line around it.

A LITTLE GENIUS

It offers 16K Ram and 16K of Basic Ram and a full-size typewriter keyboard. Eight vivid colours, high resolution graphics, three channel sound and a 40 x 24 character screen format. It also boasts four programmable function keys and a port for plug in program cartridges and would cost you £224.50 in the shops.

So whether you want to keep your hand-in playing space invaders between steller planning

for your successful fleets, or would prefer to produce your own program on the likely number of star cruisers to visit Vapos in March, the Colour Genie will provide for hours of entertainment.

So all you need to do is work a little magic on your order sheet perhaps rub the odd lantern end, who knows, a Genie may soon materialise on your doorstep ready to do your bidding.

Please cut it out as close to the line as possible and try to avoid excessive folding.

The forms are coded by number and colour and we can only accept orders written out on forms cut from the magazine, not photocopies or in any other piece of paper.

At our end the game has been designed to eliminate operator error and we are confident that this has been achieved as closely as possible but certain queries and problems may crop up during play. To sort these out we are having a Seventh Empire problem hour every week.

If you have any problems or queries on the game please ring 01-270 6558 between 3pm and 5pm on Fridays. Then we will have the computer up and running and will be able to answer your queries.

Post is both the asset and the bane of play-by-mail games. An asset because it enables games enthusiasts to find other enthusiasts and play against one

another. A bane because post is not 100% reliable.

A player can miss out a turn and start again next month without being aligned. However, late orders are a cause of misery, especially when you check through the following month's issue and find your moves would have earned top profits (A bit like winning the Pools after having forgot to post the coupon).

A deadline date when your orders are needed back is printed opposite and it is vital that you should post them back in plenty of time to make up for the vagaries of the post.

There's also the danger that you may get your orders in notoriously too late and so believe your fleets to be elsewhere, while they'll actually be lost in space.

Once the computer starts processing it takes many hours for it to come up with the new map and we cannot include late entries. So that deadline date will be final.

YOU CAN STILL ENTER

If you haven't yet entered The Seventh Empire and are tempted by what you see here. Then it's not too late to put your name down to control a space tribe in this massive stellar conflict.

You won't be able to join in this month's competition but we will include you in the following month's game.

Fill in the entry form below and return it to us quickly. The deadline for players wishing to start their Seventh Empire journey in March's issue, is the 24th of January.

To enter The Seventh Empire only costs the price of a stamp each month and enters you into an easy-to-play tactical struggle with up to 10,000 other Computer & Video Games readers.

We will despatch a 16 page rulebook to you and include you in the next available game turn.

**Please include me in the Seventh Empire Competition in March.
I name my tribe:**

My name is:

Address

Telephone

SEVENTH EMPIRE MOVEMENT ORDERS

Key	ORDER	MOVEMENT MODE	CONDITIONS
S M T	STAY MOVE TRADE	NONE TRAVEL TRAVEL	None Between empires at peace Between stars of different types and empires at peace
R R A	RAID RETURN ATTACK	ATTACK ATTACK ATTACK	Star of alien empire (phase 1) To star of original empire (phase 2) Star of empire at war with original empire
J C P	JUMP CARGO PLUNDER	GATEWAY GATEWAY GATEWAY	To another gateway star To another gateway star To another gateway star

The key refers to the computer code for the order but you should write it out in full.

WITH EMPIRE

A GALAXY TO CONQUER

Your seven fleets should now be ready to be despatched into the galactic fray. But first the following information will help you plan your campaign through the galaxy, represented by the Galactic Map (right).

The Raid Penalty to be put into your equations for this first turn is "3".

The deadline for orders is **Monday, January 24th**, so don't wait too long before returning them.

Learn to read the Diplomatic Diagram below: a line between two empires means they are at war with one-another. So the Sun Empire can expect attacks from the Bloodline, Amethyst and Pirate Empires this turn. While the Water Empire is only at war with the Dead Empire.

The seven Imperial Ships are not currently shown on this map as no player has had a chance to lay claim to one yet.

Remember: orders can only be entered on the form below (not photo copies).

FOZUZ ○	LARUB ♦	YIBET ♦	XOLIP ♥	ITIL ♦	FUNUS ♥	LULIP ♦	YANOK ♥	XOKEG ♦	ISOX ○
0.139	0.132	0.132	0.139	0.133	0.139	0.132	0.133	0.135	0.132
VIZAZ ○	QIRUS ♥	HAZAN ♦	AROB ○	SONER *	VLEPOZ ♦	QATOT ♦	HEZOD *	ASOL *	SUXEK ♥
0.134	0.133	0.131	0.139	0.134	0.139	0.137	0.137	0.133	0.134
BAROW *	WIDAN *	RURUS ♦	MUPIP *	NAXIG *	BETID *	WAVAB *	RIVEV *	MEGLD *	NABOK *
0.137	0.135	0.138	0.133	0.138	0.134	0.139	0.135	0.133	0.138
DALIX ♥	OLEX ♦	TASAT ♥	CAZUV *	GOVAX *	DITUG *	OKAP *	TOXAZ *	CIXAN *	GOTEG *
0.132	0.131	0.137	0.138	0.137	0.138	0.132	0.139	0.131	0.134
ERAK *	KOVEP *	USUG *	PEBOB ♥	JADEG *	ENAK *	KEPAR *	UGON *	POROV ♦	JINIS *
0.137	0.131	0.132	0.138	0.138	0.135	0.132	0.137	0.131	0.137
FADIS ♦	LOKIK ♥	YUSEB *	XAPUS ♦	IXIP *	FAGIL *	LEZAG *	YOOAZ ♦	XUGOD ♦	IBED ♥
0.138	0.138	0.138	0.137	0.139	0.138	0.134	0.138	0.138	0.138
VASUX *	QUXIN *	HIPLB *	ASDR *	SIDAL *	VIZET *	QAVUV *	HAKUB *	APEL ♦	SABAG ♥
0.132	0.132	0.131	0.132	0.131	0.131	0.137	0.138	0.138	0.131
BUREP ♥	WAGAP ♥	ROLEK *	MINEP *	NUVEX *	BAZIX *	WUFIY *	RORUL *	MEDEN *	NUZET *
0.132	0.138	0.138	0.132	0.132	0.131	0.138	0.132	0.132	0.132
DUSUP *	DPOD *	TUBOX *	CIGER *	GAZOR *	DABAG *	OTAN *	TUXUX *	CESER *	GRIX ♦
0.138	0.132	0.131	0.138	0.138	0.138	0.131	0.138	0.138	0.138
ELAR ♦	KERUP ♦	ULEB ♦	PIRAD ♦	JAXEL ♦	EDIE ♦	KOLOL ♦	UKOP ♦	PULUD ♦	JUVAK ♦
0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138

The Galactic Map

Star type	Trade value
♥	Elizir 200
♦	Gem 150
○	Energy 100
*	Gateway 50

Star Types



The Diplomatic Diagram

Orders in Block Caps please

Name:

Code No: ..

Telephone No: ..

	1st Movement phase		2nd Movement phase	
	ACTION	STAR	ACTION	STAR
FLEET 1				
FLEET 2				
FLEET 3				
FLEET 4				
FLEET 5				
FLEET 6				
FLEET 7				

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REVERSI

OPENINGS: PAIR EXCELLENCE

Chess has a vast store of opening theory which takes white and black into even middle game positions, built on centuries of study and documentation.

Reversi is also building up a wealth of opening theory which consist of a known sequence of moves at the start of a game and continue until one side has a large choice of good replies to choose from.

These openings usually involve filling in some, or all, of the 16 squares which make up the centre of the Reversi board.

By knowing a bit about openings, you instantly increase your chance of winning, and ensure that no-one will brow-beat you into submission early on in the game.

Unlike chess openings, Othello is young enough for openings to change according to whims of great players. So in a computer program you cannot hope to keep abreast of top moves. Better to avoid the worst blunders, then add a strong "random" factor to the rest, so that at least sometimes it plays brilliantly!

Black's first move is forced due to symmetry, so we will choose e3 as in the first diagram. White then has three choices which we have named as follows:- the "Pair" family marked "P" at f5, the "Jermal" at d3, and the Desert at f3. Top players avoid the Jermal, though I favour it if White is willing to play outside the

The champions of the Reversi (or Othello) board study their adopted game just as thoroughly as the chess and bridge masters.

And this includes nofing down classic games between rival champions and building up an opening theory.

Unlike chess where the book of openings is backed up by several centuries of chess publishing, Othello strategy is still a fairly young science and opening theories are not as stable as those in chess.

All of which makes teaching your computer to use the best openings in its first six to eight moves, very difficult.

centre. So tell the computer to play Desert or Pair most of the time.

Let's now see the general algorithms that help you avoid blunders.

The first rule is one of my basic "rules of thumb" of taking as few pieces as possible, but count the four pieces in the centre as "half" pieces. The second rule is to prefer to complete a "Pair". There are four "Pairs", each being the two adjacent squares to a centre corner, such as the centre sides at d8 and c5 marked "S".

If one square of a Pair is occupied, then the other square is attractive. It often cuts through enemy pieces, which is good play in the middle game too.

The third rule is to mildly dislike a centre corner if its Pair is empty, to hate a centre corner if its Pair is half-occupied, and to love it if the

Pair is occupied. Balance this with previous rule of thumb of course!

Diagram 2 shows an elegant opening which illustrates the general algorithms well. White plays the Pair at f5, to which Black completes the Pair at e6. White avoids the half-empty Centre corner at f3, so has to play d3. Black completes the Pair at c4.

White could then play at the f6 corner, but Black would reply at c3, so instead White plays d6. Black has an equal choice of Pairs to complete, selecting f4 (c5 being just as good). White takes the cheapest corner, as it is a bit early to play outside the centre. Black again has two equal moves, to complete a Pair at c5, or fill a corner at c3. Black choose c3. White Corner at f3, Black fills Pair at c5, and White completes the shape at c6, as per diagram 2. Black now has only four real choices, as four more are symmetrical, and one gives away a corner. This opening was played by John Parker in the 1981 British Championship to win the final game.

Now look at diagram 3. White played the Desert, Black filled the Pair at f4. White had no choice by symmetry, then Black again filled a Pair at e6. White then played at d3 — taking three pieces.

Why? I don't know. But Maruoka, a world champion from Japan beat many national champions with it. Where would you reply? c4? e2? g4? g6? Confused? Good, because now you know about as much on Othello openings as anyone.

Figure 1

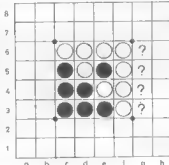
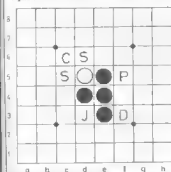
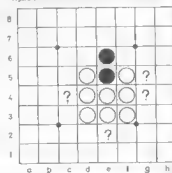


Figure 2

Figure 3



[illegible]

P r o j e c t s

MAKING MORE OF YOUR MICRO

Is there life after Kit Korner? The answer from this end is a definite yes. It of course depends on whether or not you are interested in developing new ideas for your computer.

Certainly the technical requirement will not be any more than for the other kits I have already covered. In fact that should be the least of your worries.

You may naturally feel that it is not worth the work involved and decide to buy in a ready built version. In some cases, though, these will not exist, and as I have always said it is far better to build your own as you will learn much faster.

Most of the first few designs I have lined up are based around a single i.c. The reason for this is that they are quite easy to adapt for various micros and are simple to put together.

Later on as I develop new ideas I cannot say what might happen. We will just have to wait and see. As a result of this new expansion there will be far more circuit diagrams and layouts than there have been in the past.

I have always believed that a circuit diagram paints at least a thousand words and is far more informative. Some of the peripheral boards will have some short routines to get you started but the major development will be up to you, as will the use to which you put the board.

Many months ago I took a look at a programmable timer chip, the 6840. I had for a long time wanted to have a go with one just to see what I could manage to do with it. I was pleasantly surprised.

Many of you may already have used interface i.c.s in machine code and fortunately this acts very much like one. It gives you the facility of defining outputs with a certain time lapse or for repeated outputs at set time intervals.

I used the chip first to flash up

lights just to see if it would work. Using all three outputs I could get quite a good random flash and flash length with a little logic and some mains relays.

The 6840 is a Motorola i.c. designed for the 6800 system, but will work as well with the 6802 or, with a little help, on any eight-bit machine. It needs machine code to run it or an eight-bit output port in basic or an operator who can use machine code from Basic.

Not everyone will use the same method so I will demonstrate how it works in machine code and then leave it up to you to put the finishing touches to the program. The same goes for the other peripheral boards which I will design for you. You might even like to submit your own versions of the program for scrutiny.

The other i.c. I am interested in developing further is the priority interrupt controller, the 6828. It looks like one of those white



elephants which you don't often see but which you think you could use if you only knew how.

I will be looking into some of the more interesting possibilities of interfacing to which this i.c. can be put. Interactive games controller for one.

One of the problems with this particular i.c. is that it requires a little more software to drive it, so this may be a case for some more instruction than usual.

You may be asking yourself the

question, why am I picking 6800 peripheral i.c. projects rather than the more common versions, say 6802 or Z80. Certainly there are just as many i.c.s in their sets as any others.

The main reason is that I have been working for some time on 6800 systems and hopefully know a little of how they work.

Also, 6800 and 6802 peripherals are almost interchangeable. Although Z80s are very common these days for micros they are very flexible in their acceptance of other system i.c.s. This makes the use of 6800 peripherals almost ideal for the job.

If you find any others which you think could prove interesting please do not hesitate to let me know. My articles often spring from other people's ideas.

Another idea I have been working on has been the development of a dedicated microprocessor system which would be capable of fulfilling many purposes but would take very little to build.

If you imagine a basic machine and then write down its components you will only come out with a handful. Processor, ROM, RAM, I/O, display and logic circuits.

What makes a micro so expensive? Well mostly it is the bits you don't use to the full. By dedicating a micro to a particular use you are not wasting anything. Unfortunately you will not be able to use it for very much else unless you change the ROM in it which luckily is not too difficult.

As well as being relatively cheap the whole micro will go on to one small board a little larger than Euro-card size. Ever heard of miniaturisation?

However much work is involved in the projects I will of course be showing you the best and hopefully the shortest cuts to getting your prototype to work well.

I hope also that you will help by sending me your own hints and ideas so that I can pass them on to other readers. It all helps in the learning process, which is what we are here for.

Keith Mott

megger table and put the numbers into that, but this would have required two bytes per number and, in addition, I would have needed more DATA lines and the necessary programming to set the table up.

I estimate an extra 200 bytes would have been needed to do this, quite apart from the additional time delay. Accessing the string is done using MDS and VAL. You should always look for these savings.

Full marks if you have seen that I could have made the table smaller by putting 3 numbers in one byte (because 6 to the power of 3 is less than 255, the capacity of one byte).

Now back to the pieces. There are several different types:

- 1 The men are represented by the variables H(1) to H(5).
- 2 Boulders are held in C3 and the Headquarters piece is held in C5.
- 3 A major part of the Fort is in GT.
- 4 D(2) to D(20) are the elimination routines and operate like a filmstrip. I find explosions very difficult to define authentically, so in these sequences I push the man into the ground!

The TRS-80 graphics are very simple. The video has 16 rows of 64 blocks and each block contains 6 pixels numbered as fol-



12 bytes by using the DIM statement.

Line 790 asks for a scenario number. All my games have their own random number generator which is seeded with this number. This enables players to replay the same map layout, either because they wish to reverse sides and play under the same conditions or because they discover a particularly interesting set up. The seed, WD, is calculated from the scenario number. When a random number is needed between, say, 1 and 6, R3 is set to 6 and the generator, line 260 is called. The variable, WN, returns the random number and WD is reseeded. Note that W is defined as Double Precision. Once the board has been set up, I use the Basic random number generator to determine the outcome of attacks.

We now call the initialising routine at 1100. Lines 1100 to 1160 prepare the machine code routines by setting up the JUMP table (variable RU).

Do you find this table confusing? Some of the routines call subroutines just like GOSUB in Basic. For example, the routine in XS(1) calls XS(2). Strangely, however, tend to move around in memory during program development and therefore the address of XS(2) will change.

WARPATH

Lead the cavalry charge or plan the Indian ambush. Part II of Ron Potkin's series which combines advanced programming tips with a listing which builds into a thrilling wargame. This month, Ron looks at the pieces.

rows:

1	2
4	8
16	32

To this you must add 128. H(1) — the bowman is made up of 156 and 148, i.e.

2	
4	8
16	16

CHR\$(104) is an East pointing arrow. Many computers do not have this character — I suggest you replace this with the "Greater than" sign (ASCII 62).

Before you start typing, LOAD the program from last month. Now add the Basic listing below. This contains a graphic loader. Make sure you type lines 950 to 1080 exactly as they appear. You should also type the change in line 821.

Make sure you save the program before running it; there are several POKE and you easily run it with a wrong instruction. Incidentally, always save the updated listing onto a new

tape. If anything does go wrong you can always fall back on the previous month. Now type RUN and in answer to the questions, "ENTER THE SCENARIO NUMBER" and "HOW MANY BOULDERS?", type any low number — these are unimportant at present.

After all that hard work, I expect you want to see some action, but we can't do much yet. The subroutines at line 860 includes those lines necessary to put the pieces on the map, but before we can do this I must explain two more arrays, PTABLE and IBOARD. These will be the subject of next month's article. In the meantime, lines 2510 and 2512 have been adjusted so that the men will be printed in the BIGSCREEN. This will probably create as many Generals as Troopers but it will give you an opportunity to see the results of your efforts.

Line 780 dimensions all arrays. Make sure you include even the small ones. KB, for example, only uses KB(0) and KB(1), i.e. 4 bytes. You can save about

Although I can calculate this and POKE it into XS(1), I risk poking either a zero or 34 into the Basic line which would run the program. Instead I have created a table whose address is fixed and which can never contain 0 or 34. The address of XS(2) is poked into this together with a JUMP instruction. This enables XS(1) to call the table which in turn jumps to XS(2).

The problems with zero and 34 occur with the TRS-80 using Microsoft Basic. Zero is used to signify to the interpreter the end of a Basic line and 34 is the quote character signifying the end of a string. Other computers using different interpreters may vary. On the ZX81 the number to avoid is 76.

I have created variables which are entry addresses to the USR routines, i.e. B1 — XS(1) address for BIGSCREEN. B4 — XS(4) address for SEARCH. B7 — XS(16) address for RANGE.

XS(3) is the CLEAR routine. It is used in line 1160 only. Next month we will examine PTABLE and IBOARD.

Two more spell-binders from



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It's my own fault. I even volunteered. I thought that with the spare doses and its shovel and skyhook it would be easy shifting the galaxy's rubbish. Chals play. HUHI! They wanted me of the weird packaging, the trays, the rods, and all the rest.

But they didn't say I'd have to stop and control not just one but two or even more garbage pods. Then prod them, push them, toward that black hole, and oh, it's so very, very black, and so lovely, so empty.

Panic, much? Panic, but they won't stop, heeling and spinning and turning, always turning, towards me, against me, at me. And I'm alone.

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*As reviewed in December 1982 Sinclair User.

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BOLDLY GOING WHERE OTHERS FEAR TO TREAD

STAR RAIDERS

Star Raiders was generally acknowledged as being a "state of the art" computer game when it was launched last year.

This jargon term simply means that in terms of quality of graphics, playability, and game development the cartridge is the best that present technology has produced.

The game puts you in the cockpit of an Atarian Federation star cruiser chasing the enemy Zylons through space.

By pressing a button on the computer keyboard a map of the galaxy is displayed. This shows the position of enemy ships and star-bases in relation to your craft.

There are three types of ships to be dealt with: Zylon Fighters are designed for high-speed attacks and can be deadly at close range.

Zylon Cruisers have assigned patrol routes within certain sectors and will only attack if provoked. Basestars can only be destroyed at close range. Use extreme caution when attacking a Basestar.

As well as enemy ships you will also have to avoid the masses of meteoroids that are spinning through space.

To aid you in your mission you have a number of sophisticated battle and flight control instruments: Computer Attack Control flashes up gun sights on the screen and enables you to lock on your photon torpedoes, but the Galactic Chart is your most useful aid in your pursuit of the Zylons.

This shows you the entire galaxy divided into sectors containing either enemy starships, friendly starbases, or are completely unhabited.

The Hyperwarp enables you to travel at accelerated speed to different sectors and the long range scan shows you the positions of approaching enemy fighters.

You can work your way up through the ranks of the star fleet while you play. Some of the ranks will amuse you.

Once this has been achieved the real fun can begin as you work your way up through the ranks from rookie to Star Commander. The good thing about the game is that it is pretty tough to win the top rank rating.

Star Raiders is available from most good Atari dealers at £29.95. Not cheap - but an excellent addition to your games library. Now the less it runs on an Atari 400 and 600 with version also available for the VCS.

- Getting started 9
- Value 7
- Playability 8



BEWARE OF THE DEADLY BALROG

SORCERERS ISLAND

Once marooned on Sorcerers Island your only hope is to find the hidden escape route.

Numerous hidden baasbas will try to stop you and take your life during your quest for the lost exit. Some are easy to deal with - but the deadly Balrog will show no mercy.

You start this adventure with 2,000 life points which decrease as you battle with various monsters to collect the baasbas you find along the way.

After each move you are a map of the island is available for your perusal - and you can also check out the spaces immediately next to your present position. Unfortunately neither show the exit or the monsters.

Sorcerers Island is one of two adventure games for the ZX81 from Psion.

The other - which also requires 16K to run - is Perilous Swamp. This is the easier of the two games you have to rescue a princess from an evil wizard. There are more monsters and lots of action. I am more yon try Perilous Swamp first. I've yet to solve Sorcerers Island. If you like adventure games then this cassette is well worth the price of £4.95.

- Getting Started 7
- Value 7
- Playability 7

BUGGIES WILL SIMPLY DRIVE YOU CRAZY!

BAJA BUGGIES

This is very much like the VCS game Night Driver. But Gemstar, the new American Atari software company who released this new game have made full use of the superb graphics of the Atari computers.

The scene is set in the Californian desert. Sand-dunes lurk at the top of the screen with a golden sunset on the horizon.

The object of the game is to win the race. But as you start last there are 80 buggies in front of you! Your speed accelerates automatically and when you pass the fire button your brakes go on. You have to slow down or you will lose control.

At the bottom of the screen there is a control panel. This shows your speed, your

position in the race. There's a radar scan which shows how far you are from the finish line. The radar also shows where the leaders are.

If your average speed is better than the speed already on the scoreboard you get a chance to put your initials up. If you wish to join the Baja Buggies Club you must take a photo of your initials to the manufacturers. In return they will send you a key-ring and membership card.

One of the annoying things with the game is that if you crash your buggy too often or go off the road too often your buggy will break-down and the game is over. Graphics wise buggies could be better. The sounds are also pretty poor in comparison with games like Preppie.

This 16K game for the Atari 400/800 was good fun to play but overall it was rather disappointing. Baja Buggies is available from Gemint Electronics of Manchester at £19.95.

- Getting Started 5
- Value 7
- Playability 6

DINING OUT WITH THE GHOSTS

SPECTRUM PACMEN

A pack of Pacman-type games have been cluttering up the C&VG reviews office over the last few weeks. A new maze gobbling game is added to the list of software available for the Spectrum at the rate of about one a week.

We tested a batch of the more obvious straight copies of the arcade original.

First on the screen was Spookyman from Abbey Software of London.

This game got off to a bad start as it did not tell me which keys to move my little man around the maze. A game consideration in this game!

Although the maze looked fairly good the Pacman somehow failed to convince. It just didn't feel like gobbling a little chap with a personality of his own.

Having just borrowed an Atari 400 with a Pacman cartridge I was used to much better player involvement in the game.

If you got caught by one of the ghosts the game paused for an annoyingly long period. There is also an absence of shrinking and gobbling sounds and the characteristic gulp, gulp, gulp as you clock 200 then 400 and 800 in the arcade original.

Next up was Mazeman from Abasoft of Oyfed. This was the latest and most playable of the pile but this too left a little too much to be desired.

The game produced no sound effects, bonus fruits or flashing ghosts.

All of the games would have been greatly improved by the use of a joystick. Playing Pacman without a joystick is rather like Blackpool without the illuminations.

Based on Pacman but with a few twists

of its own was Gulpmen from Campbell Systems of Essex. This game offered thorough instructions with a comprehensive list of game options.

You could choose one of fifteen mazes and vary the speed of your little man and the chassis.

Another interesting variation on the basic Pacman theme was a laser-gun with a limited amount of energy with which you could shoot the chassis.

On the minor side Gulpmen has pretty basic graphics. The Gulpmen for example moves around the maze without moving his legs. It would have been more convincing had the program simulated some sort of running motion.

Artic Computing of Hull also produce a Pacman type game called Gobblerman, which I believe is a fairly close copy of the arcade game. I cannot give you my comments on this game however as it steadfastly refused to load on my Spectrum.

I was not over impressed with any of these versions. I don't know if it's the software or the machine but frankly Spectrum Pacman is not a patch on its Atari and BBC model B counterparts.

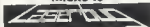
But if you really want a Pacman for your Spectrum, Gulpmen just pipe Mazeman. You might be better advised going for some of the original maze chomping games.

	Spectruman	Mazeman	Gulpmen
● Getting started	5	8	9
● Value	5	6	6
● Playability	4	5	7

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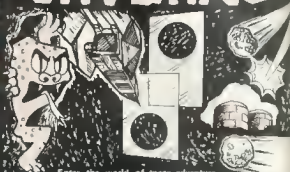
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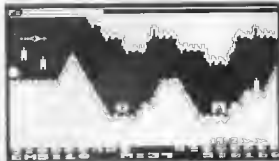
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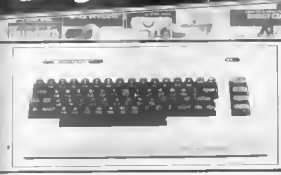
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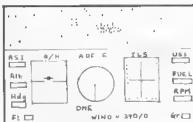
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level goals

4. Use the enter key to move to next
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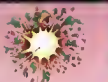
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